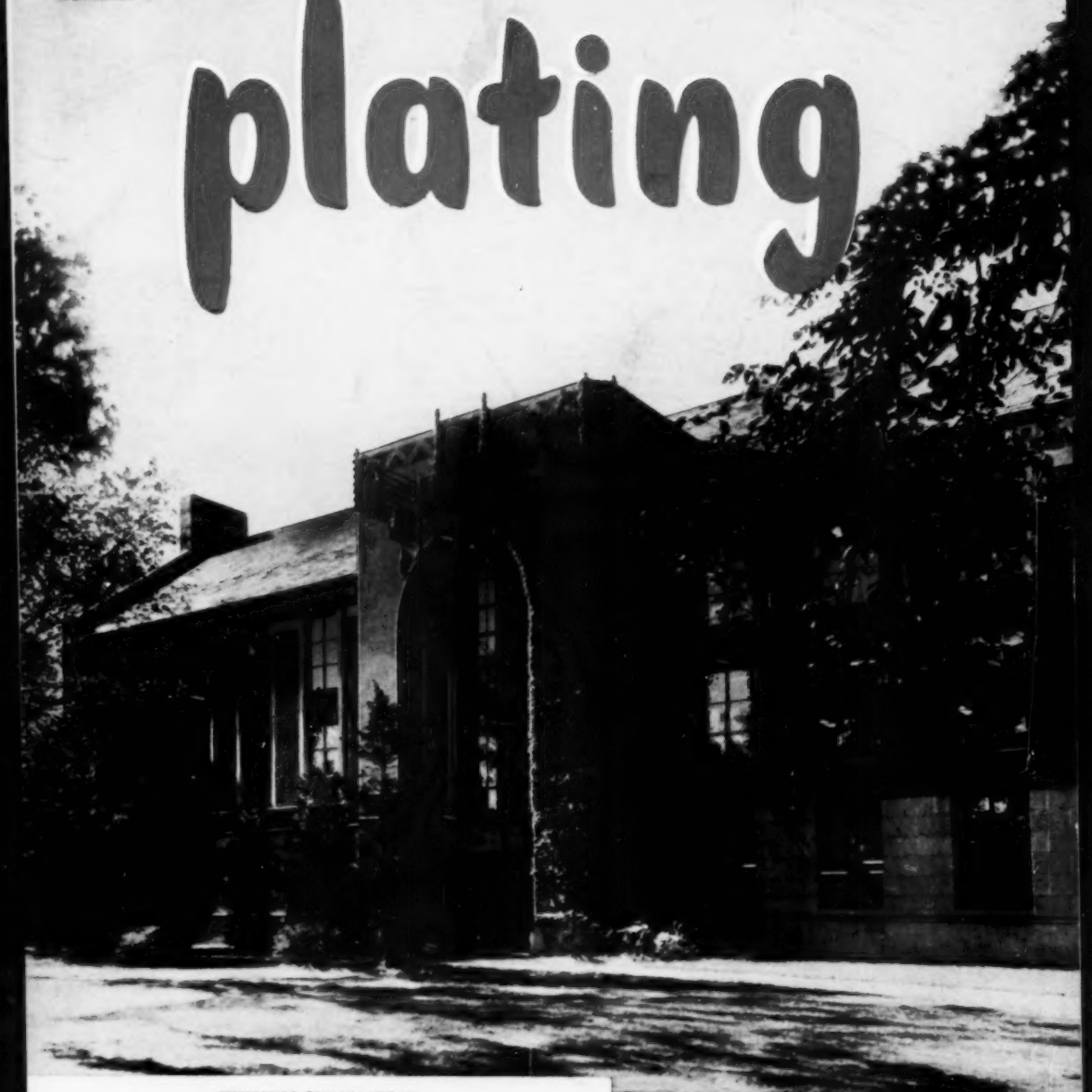
VOLUME 39
NUMBER 9

SEPTEMBER, 1952

plating



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RINSING

See Contents Page 1013

KEYS TO TIME TESTED CLEPO PRODUCTS FOR THE ANODIZING DEPT.

CLEANING BEFORE ANODIZING

1 • NON-ETCH CLEANING
CLEPO-86-P

2 • ETCH-TYPE CLEANING
CLEPO-34 Spl. Cleans and produces a soft white satin finish

3 • CLEPO-SAT-N-ETCH PROCESS
CLEPO-30-R Alkaline Etch
CLEPO-180-K Acid Desmutter

4 • BUFFED ALUMINUM CLEANING
CLEPO-98-C Followed by
CLEPO-86-P

5 • AFTER ANODIZING
for Stripping Racks and Rejects
CLEPO-195-A
CLEPO-AL-SALTS

FREDERICK GUMM Chemical Company Inc.

538 FOREST STREET, KEARNY, N. J.

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 1100.

JET BLACKS

Zinc plated typewriter key levers are a typical example of how the EBONOL * "Z" process provides an adherent, jet-black inorganic oxide finish to all types of zinc plated surfaces.

*Reg. Trade Mark

For blackening metals use ENTHONE EBONOLS

EBONOL "S" Processes for blackening steel to produce jet-black oxide coatings. Simple and economical to operate. Operating temperatures: EBONOL "S", 285-290°F., EBONOL "S-30", 295-305°F.

EBONOL "C" The quality black for copper and brass that meets all military specifications. Produces cupric oxide finishes that are stable, adherent and protective.

EBONOL "Z" A durable, deep, rich finish for zinc plate or zinc alloy castings. Dull or glossy oxide black coatings are formed in from 5 to 10 minutes at 160-180°F.

U. S. PATENT NOS. 2,364,993, 2,460,896, 2,460,898, 2,481,854.

Write to Enthone, Inc. for information and advice on any blackening process and ask for check list of Enthone literature on over sixty products and processes for better electroplating and metal finishing.

METAL FINISHING PROCESSES

ENTHONE
INCORPORATED

ELECTROPLATING CHEMICALS

442 ELM STREET
NEW HAVEN, CONNECTICUT

AMERICAN CHEMICAL PAINT COMPANY

AMBLER ACP PENNA.

Technical Service Data Sheet
Subject: SPECIFICATION RUST PROOFING AND PAINT BONDING CHEMICALS

SPECIFICATION NUMBER	ACP SPECIFICATION CHEMICAL	SPECIFICATION TITLE
QQ-P-416	"LITHOFORM" "ZINODINE"	PLATING, CADMIUM (ELECTRODEPOSITED)
RR-C-82	"LITHOFORM" NO. 32	CANS, CORRUGATED: ASH AND GARBAGE, TAPER-SIDE, ZINC-COATED, WITH COVERS
MIL-C-5541 (See also QPL-5541-1)	"ALODINE"	CHEMICAL FILMS FOR ALUMINUM AND ALUMINUM ALLOYS
MIL-C-16232 Type I Type II	"THERMOIL-GRANODINE" "PERMADINE"	COATINGS — PHOSPHATE, OILED, SLUSHED, OR WAXED (FOR FERROUS METAL SURFACES) AND PHOSPHATE TREATING COMPOUNDS
MIL-E-917A (Ships)	"GRANODINE" "LITHOFORM" "ZINODINE"	EQUIPMENT, ELECTRIC POWER, BASIC REQUIREMENTS FOR (NAVAL SHIPBOARD USE)
MIL-L-3077	"PERMADINE"	LINKS, METALLIC BELT, FOR SMALL ARMS AMMUNITION
MIL-S-5002	"ALODINE" "GRANODINE"	SURFACE TREATMENTS (EXCEPT PRIMING AND PAINTING) FOR METAL AND METAL PARTS IN AIRCRAFT
MIL-V-3329	"GRANODINE"	VEHICLES, COMBAT, SELF-PROPELLED AND TOWED, GENERAL REQUIREMENTS FOR
JAN-C-490, Grade I	"GRANODINE"	CLEANING AND PREPARATION OF FERROUS METAL SURFACES FOR ORGANIC PROTECTIVE COATINGS
JAN-F-495	"GRANODINE" "LITHOFORM"	FINISHES FOR EQUIPMENT HARDWARE
JAN-L-548A	"PERMADINE"	LINK, METALLIC BELT, 20 MM., MB
JAN-T-704	"GRANODINE"	TREATMENT AND PAINTING (FOR CONSTRUCTION AND ENGINEERING EQUIPMENT)
AN-E-19	"ZINODINE"	ELECTRONIC EQUIPMENT; GENERAL SPECIFICATION FOR
AN-F-20 (See also U.S.A. 3-213)	"ALODINE" "GRANODINE" "LITHOFORM" "PERMADINE" "THERMOIL-GRANODINE" "ZINODINE"	FINISHES, FOR ELECTRONIC EQUIPMENT
U.S.A. 57-0-2C Type II, Class A Type II, Class B Type II, Class C	"THERMOIL-GRANODINE" "PERMADINE" "GRANODINE"	FINISHES, PROTECTIVE, FOR IRON AND STEEL PARTS
U.S.A. 51-70-1 Finish 22.02, Class A Finish 22.02, Class B Finish 22.02, Class C	"THERMOIL-GRANODINE" "PERMADINE" "GRANODINE"	PAINTING AND FINISHING OF FIRE CONTROL INSTRUMENTS, GENERAL SPECIFICATION FOR
U.S.A. 50-60-1	"GRANODINE"	CONTAINERS, METAL, FOR ARTILLERY AND ROCKET AMMUNITION
U.S. Navord O. S. 675	"ALODINE"	SPECIFICATIONS FOR THE MANUFACTURE AND INSPECTION OF CARTRIDGE, POWDER, AND ROCKET TANKS (ALUMINUM)
U. S. N. Appendix 6	"LITHOFORM"	INSTRUCTIONS FOR PAINTING GENERAL SPECIFICATIONS FOR BUILDING VESSELS OF THE UNITED STATES NAVY
M-364	"PERMADINE" "THERMOIL-GRANODINE"	NAVY AERONAUTICAL PROCESS SPECIFICATION FOR COMPOUND PHOSPHATE RUST-PROOFING PROCESS
16E4 (Ships)	"ALODINE" "GRANODINE" "ZINODINE"	ELECTRONIC EQUIPMENT, NAVAL SHIP AND SHORE: GENERAL SPECIFICATION
AN-C-170	(See MIL-C-5541)	CHEMICAL FILMS FOR ALUMINUM AND ALUMINUM ALLOYS
U. S. A. 72-53	(See AN-F-20)	FINISHES (FOR GROUND SIGNAL EQUIPMENT)
AXS-1245	(See JAN-C-490)	CLEANING AND PREPARATION OF FERROUS METAL SURFACES FOR ORGANIC PROTECTIVE COATINGS (EXCEPT FIXED INSTALLATIONS)

CHEMICALS ACP PROCESSES

WRITE FOR DESCRIPTIVE FOLDERS ON THE ABOVE CHEMICALS AND FOR INFORMATION ON YOUR OWN METAL PROTECTION PROBLEMS

CHEMICALS ACP PROCESSES

In This Issue

Rinsing by H. L. Pinkerton presents additional data over and above that published in previous papers on this subject and is of special interest to those responsible for the most efficient use of water in metal finishing and similar chemical processing operations.

Radioactive Isotope Dilution Method for Determining Sulfate Concentration in Chromium Plating Baths by S. L. Eisler. A new method of analysis for sulfate concentration is of interest to the chromium plater. High results of the conventional analytical method based on barium sulfate precipitate are caused by co-precipitation of other ions with barium sulfate. That these results can be 5–13 per cent high is seen in a comparison made between the conventional gravimetric method and the new radiochemical method. Tests of the new method show it to have good reproducibility and the results to be within 1–3 per cent of the true value of the sulfate concentration.

Hard Chromium Plate to Improve the Corrosion Resistance of Tool Steel by H. E. Ricks recommends a pre-plated surface finish of 5 micro inches or less and a chromium plate thickness of at least 0.0005 inch for use on plastic molds as a result of carbon dioxide bubbling and 95 per cent relative humidity testing procedures.

Abstracts of Convention Papers concludes the series of technical papers presented at the 39th Annual Technical Sessions at the Stock Yards Inn, Chicago.

We Yearn To Learn Continue A. E. S. Wives in 1952 by Mrs. A. R. Hoffman reports the activities of the distaff sections of the A. E. S. at the Convention.

1952-1953 Speaker List is the newest grouping of the speakers and their topics available to the various Branches of the A. E. S. for the current season.

The Effects and Removal of Zinc — A Research Report by D. T. Ewing, A. A. Brouwer, D. D. Clark, R. J. Rominski, J. K. Werner, and C. J. Owen is the fifth in the Project 5 series dealing with nickel plating solutions.

For page number see Table of Contents, page 1013

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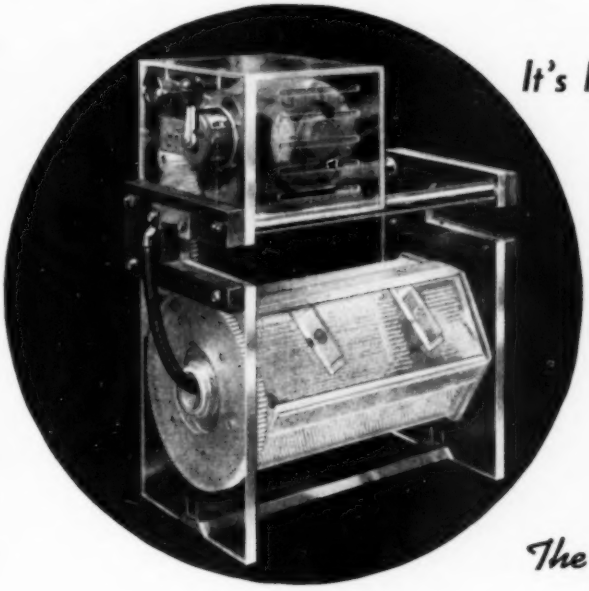

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The 1953 Model

PORTABLE Lucite Plating BARREL!

THE STUTZ PORTABLE PLATING BARREL is designed and constructed of High Temperature Lucite to provide continuous processing of piece parts through the operations of Alkali Cleaning, Water Rinsing, Acid Treatment and Plating. Progression through these operations is made by manual handling or if necessary with the assist of an overhead traveling hoist. The Stutz Portable Plating Barrel is made in 2 sizes with cylinders having inside dimensions of 6" x 12" and 8" x 18". Standard perforations are 3/32" or larger. Smaller openings can be furnished as required. All gears are ½" High Temperature Lucite. Gear bearings are permanently lubricated. New heavy duty motor. Operating temperature up to 185° F.

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Manufactured by:

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PEERLESS PRODUCTS

1643 CARROLL AVENUE CHICAGO 12, ILL.

Industry News

New Lea Subsidiary. The Lea Manufacturing Company announces the formation of a wholly owned subsidiary known as Lea Manufacturing Company of Michigan, Inc., formed for the express purpose of manufacturing and marketing Gripmaster polishing wheel cement. Lea Manufacturing Company of Michigan, Inc., has purchased the patent rights, trademark rights and goodwill of Gripmaster from the Nelson Chemicals Company, Detroit, Mich.

A new plant in Detroit is under construction which will house Lea and Gripmaster and when the plant is ready appropriate announcement will be made. Until then Lea will manufacture and sell Gripmaster on the premises of Nelson Chemicals Company, 12345 Schaefer Highway, Detroit, Mich.

Lea's Detroit Manager is Dee F. Mosher of 550 S. Glenhurst, Birmingham, Mich.

Titanium-Dioxide Rectifiers. A new type of rectifier recently developed by the **National Bureau of Standards** promises to be the first major improvement in metal-oxide rectifiers since their introduction in 1926. The new rectifier is composed of a layer of semi-conducting titanium dioxide, a sheet of titanium metal, and a counter-electrode of some other conducting metal. Although the development is still in an early stage, preliminary investigations have shown that the units withstand voltage in the reverse direction reasonably well and that their properties are satisfactory at elevated temperatures. Both the initial development and subsequent detailed exploratory investigations are the work of R. G. Breckenridge and W. R. Hosler of the NBS Solid State Physics Laboratory.

New Synchro Plant for Beckman Instruments, Inc. Beckman Instruments, Inc., South Pasadena, Calif., announces the opening of a large new plant devoted exclusively to the manufacture of synchros and associated components—bringing the number of plants in the Beckman operations to a total of fifteen.

The new plant, just completed and specially designed to house synchro operations, is entirely air-conditioned and is equipped with special electrostatic dust filters to permit highest-precision manufacturing techniques.

Protective Coatings Exhibit. Main theme of the recent Protective Coatings Exhibit at the Statler Hotel, Washington, D. C., was the application of protective coatings for steel, zinc, and aluminum to military products to increase their durability under service conditions. Purpose of the displays was educational—to show Government personnel how protective coating techniques, now standard practice in civilian production, can be effectively adapted to military production.

New Barrett Research Laboratory at Edgewater, N. J. A new laboratory, specially designed to develop and test materials and processes used in the manufacture of plastics, rubber products, paints and varnishes, paper, laminates, insulating materials and a wide range of other products was opened recently by Barrett Division, Allied Chemical & Dye Corporation.

The laboratory will be known as the Studyside Applications Research Laboratory and will be in charge of D. A. Rankin, Superintendent.

Name Change. Industrial Lining Engineers, Inc., Pittsburgh 1, Pa., have announced they are changing their company name from that above to **Chase Chemical Corporation.** A change in name only, plant locations, activities, personnel, policies, as well as ownership, will remain the same as in the past. Manufacture of paint driers and related chemicals will be carried on as usual at the Smallman Street address. All tank lining work will continue at the Edgeworth, Sewickley, Pa., plant.

New Tumbling Division. Industrial Supplies & Equipment Company, King St., Greenwich, Conn., announce the opening of the Insco Tumbling Division at 26 Charles St., Meriden, Conn. This new division has been organized in response to an increasing demand for a modern tumbling operation which will do barrel finishing for the metal working industry on a sub-contract basis.

The division will be managed by Mr.

INVENTIVE SERVICE HAS MADE THIS "MANN" A VALUED METAL CLEANING COUNSELOR FOR —

Bassick Company
Chemical Corps
S. W. Farber, Inc.
Frankford Arsenal
General Electric
Gong Bell
Hyatt Bearings Division
Leviton Manufacturing Co.
Marlin-Rockwell Corp.
Remington Arms Company
Singer Manufacturing Co.
SKF Industries, Inc.
A. G. Spalding
Springfield Armory
Turner & Seymour
Union Hardware
U. S. Mint
Whitney Chain

and many other outstanding metal working industries.

FRANK T. MANN
Eastern Representative
of N. Ransohoff, Inc.

At your service if you are located in his territory.

Inventive, practical, Frank Mann typifies the able counsel that can be yours through the incomparable Ransohoff metal cleaning engineering service. The Ransohoff field and headquarters staffs comprise more than 175 years of specialized, creative engineering for cleaning and surface treating metals. That is why Ransohoff tailored-to-the-job equipment leads the field and is preferred by leading users of metal cleaning and surface treating devices.

N. RANSOHOFF, inc.
EQUIPMENT FOR THE SURFACE TREATMENT OF METAL
5817 Vine Street, Cincinnati 16, Ohio

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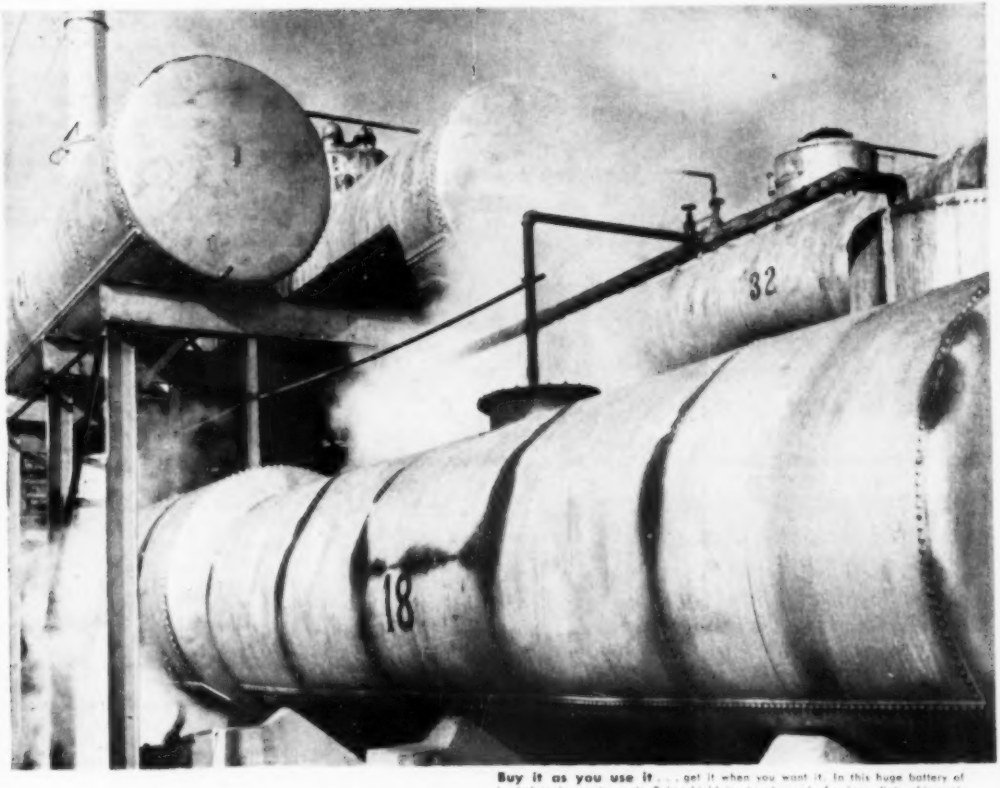


Buy it as you use it . . . get it when you want it. In this huge battery of heated tanks newly made Palmoshield is stored, ready for immediate shipment.

Not half a world away

. . . right in the heart of the industry!

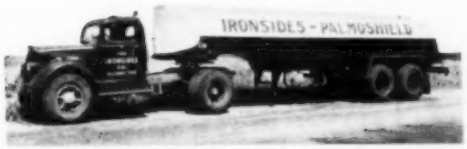
Threats of war . . . shipping uncertainties . . . materials shortages. These headaches fade away when you use Palmoshield as the essential lubricant in your rolling operations.

For Palmoshield is an all-American lubricant made from freely available domestic materials in centrally located Columbus. You buy it as you use it. You get it when you want it. You need not tie up space or funds in stockpiling.

Introduced in January, Palmoshield is already in general use or on test by two-thirds of the major tin-plate producers of this country and Canada. Months of on-the-job experience have established the new lubricant as a proven replacement for imported palm oil.

Palmoshield is subject to exact chemical control; you can specify free fatty acid content to 1/2%—and get it. It looks, feels, acts, handles like palm oil; requires absolutely no changes in mill operation. It improves production, gives increased tonnage at less cost. Its price is not artificially controlled, but rises and falls freely with the domestic fat market.

To meet expanding demand, manufacturing and storage facilities have recently been greatly enlarged. Palmoshield is now available for immediate shipment in any quantity in both 55-gallon drums and tank car lots. For details write The Ironsides Company, 270 West Mound Street, Columbus, Ohio.

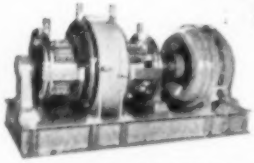


In emergencies overnight shipment can be made direct to your mill by tank truck not dependent on rail schedules.

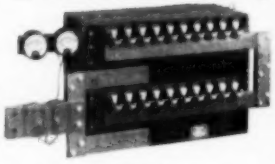
SPECIAL LUBRICANTS and PRESERVATIVES

IRONSIDES SHIELD PRODUCTS **PALMOSHIELD**

COLUMBIA



MOTOR GENERATORS
for Electroplating, Anodizing,
Electrocleaning, Electropolishing



TANK RHEOSTATS

- REVERSING SWITCHES
- TONG TEST AMMETERS

Protected Territories Available to Qualified Sales Engineers

COLUMBIA ELECTRIC MFG. CO.
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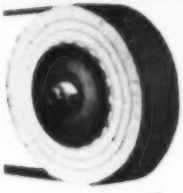
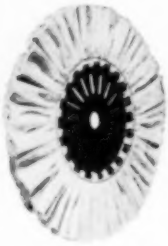
A FEW OF THE MANY
FORMAX
PRODUCTS



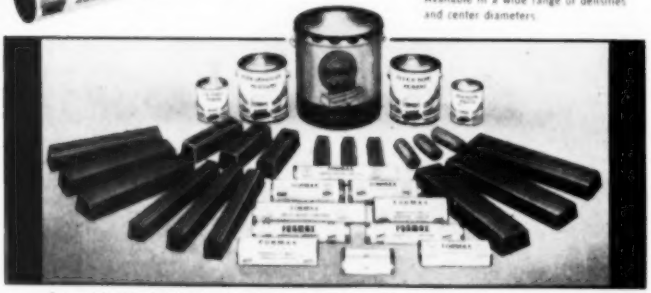
STYLE C-20
CONTACT WHEELS
and F-26 Belt Lubricant

A C-20 flexible Contact Wheel will form itself to the shape of the work and permit the abrasive belt to polish contoured surfaces and F-26 Abrasive Belt Lubricant will increase belt life by preventing loading and glazing. Produces finer smoother and brighter surfaces through lubrication.



ZIPPO BUFFS

These famous long-wearing buffs run cool under all buffing conditions. Constructed of high count bias cut cloth or sisal mounted on safe steel centers. Available in a wide range of densities and center diameters.



A complete line of buffing compounds in bar form as well as in liquid form for brush or spray application. Also Flex-A-Glu polishing wheel cements.

Our Laboratory and Sales Engineering staff would welcome the opportunity to be of help in solving your finishing problems.

Send for descriptive literature

FORMAX MFG. CORP.
DETROIT 7, MICHIGAN
"THE FOUR McALEERS"

MANUFACTURED IN CANADA BY JOHN GALLOWAY LTD., KITCHENER, ONT.

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 1107.

Industry News

William Biebel, formerly Methods Engineer in charge of all polishing, buffing and tumbling at Singer Manufacturing Company, in Bridgeport. He has had wide experience in all phases of metal finishing and has developed many special tumbling techniques.

The most modern barrel finishing equipment will be used. It will consist of everything from small bench barrels, for tumbling watch and other tiny parts, to high production equipment and to submerged barrels for high color burnishing and ultra-low micro inch finishes.

Commercial Filters Corporation's New Location. Commercial Filters Corporation announce a change of address from 18 W. Third St., Boston 27, Mass., to Two Main St., Melrose 76, Mass.

Practical Electroplating Course

The City College, School of General Studies, Evening Division, Convent Avenue at 138th Street, New York City, announces a course in Practical Electroplating.

Time: Mondays 7:00–8:50 P. M. Fall, 1952.
First Session—Monday, September 22, 1952.
Course: TCh 4. Practical Electroplating.
Registration: September 16th and 17th, 6:30–8:30 P. M., Main Bldg., Convent Avenue and 139th Street, New York City.
Fee: $18.

The primary object of this course is to provide commercial electroplaters with a sound understanding of the principles underlying their work; applications of *p*H; principles of metal plating; plating with the various metals; surface preparation; uniform plating thickness; plating on nonconductors; electroforming records and electrotypes; electropolishing; testing of metal deposits; analysis and control of plating solutions.

Prerequisite: A college course in general chemistry or extensive commercial electroplating experience.

Topper Equipment Company Breaks Ground for New Clark Township Plant. A new plant is being constructed by Topper Equipment Company

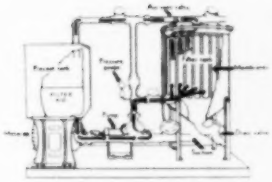
WANTED

Salesman with following in conventional and bias buff line. Salary plus commission and quarterly bonus plan. All territories open. Replies held in strict confidence.

P-952-A, PLATING
145 Broad St., Newark 2, N. J.

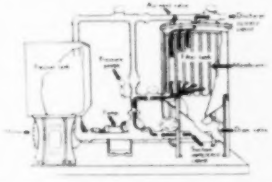
PRECOATING

requires only minutes. Filter-Aid is evenly distributed. No time waste . . . no material waste.



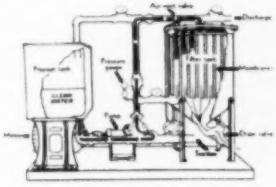
FILTERING

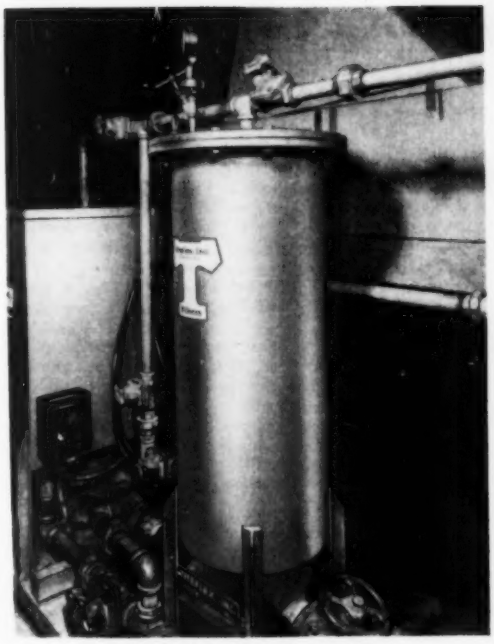
is simple . . . sure. Suspended particles down to 1/10 micron are removed. Color . . . taste . . . smell . . . chemical composition are unaffected.



CLEANING

is fast . . . easy. Simple reversal of flow for backwashing at pressures up to 100 psi insures complete cake-break-up. Cleaning is complete in minutes . . . no manual removal of residue.





Titeflex filter installation in filter department at Stromberg-Carlson, Rochester, N. Y.

How Titeflex Simplicity Saves Time and Money for STROMBERG-CARLSON

Removal of anode sludge from Zn $(CN)_2$ type bath in Stromberg-Carlson's Zinc Plating operation has been no problem since they installed a Titeflex filter.

Simplicity Keynotes Operation

Real economy results from Titeflex simplicity. They save time because filter can be cleaned easily, in minutes, on a daily basis. They save money because no replacement of filter-bags or other elements is needed. They save on rejections because daily cleaning results in better, more uniform plating.

Titeflex Filters Can Help you

For every filtering operation large or small there is a Titeflex filter to do the job — and do it better. Capacities from 200-1000 G.P.H. up . . . filter areas from 5 to 450 square feet are available as standard construction or on special order. Find out more about Titeflex filters . . . and what they can do for you . . . today. Clip and mail the coupon for complete information without obligation.

Let Our Family of Products Help Yours

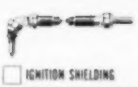
Titeflex

✓ Check products you are interested in.

☐ SEAMED AND SEAMLESS METAL HOSE

☐ PRECISION BELLOWS

☐ IGNITION HARNESS



☐ IGNITION SHIELDING

☐ ELECTRICAL CONNECTORS

☐ RIGID AND FLEXIBLE WAVE GUIDES

☐ FILTERS

☐ FUSES

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Newark 5, N.J.
Please send me without cost information about the products checked at the left

MAIL COUPON TODAY

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TITLE _____
FIRM _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

Industry News

for the manufacture of their Circo vapor degreasing and steam cleaning equipment in Clark Township (Rahway), N. J., adjacent to Lehigh Valley Railroad. This new plant will be approximately 30,000 sq. ft. and is being designated as Plant No. 1, and the present factory in Matawan, N. J., as Plant No. 2.

Recently, Topper Equipment Company purchased the degreasing equipment business of the Optimus Equipment Company including all patents and trade marks.

News from Spain. Institute Electroquimico, S. A. of Barcelona, Spain announces completion of a new building. The company, an important supplier in Spain for electroplating equipment and supplies, manufactures polishing and grinding machines, drums, barrels, control panels, trichlorethylene degreasing equipment and, in general, all the necessary equipment for plating installations.

New Hamilton Standard Division Plant. The Hamilton Standard Division of United Aircraft Corporation has started its move from East Hartford to its new Bradley Field Plant at Windsor Locks, Conn.

Other departments will follow the purchasing department which was the first to be moved.

Kirk & Blum Celebration. Almost 1200 years of service with The Kirk & Blum Manufacturing Company were commemorated recently at a dinner when the Cincinnati dust control system manufacturer honored 40 employees who have been associated with the firm from 25 to 44 years. Each person received a suitably engraved gold watch.

The men honored at the dinner returned the compliment with a set of matched luggage, presented to the firm's president, Richard J. Blum, Jr.

Located on Spring Grove Avenue in Cincinnati for 34 years, the firm recently moved to enlarged facilities in the Oakley Factory Colony.

World War II Movies. World War II 16-mm sound movies. Two 1500-foot reels, run approximately 45 minutes each. Actual front line action from start to finish of the war. Furnished without charge to associations, clubs, employee organizations, etc. For your reservation write Harvie Johnson, c/o Belke Manufacturing Company, 947 N. Cicero Ave., Chicago 51, Ill.

Speer Carbon Merger. Speer Carbon Company, Saint Marys, Pa., and its subsidiaries, Jeffers Electronics, Inc., DuBois, Pa.; International Graphite and Electrode Corporation, Niagara Falls, N. Y., and Speer Resistor Corporation, Saint Marys, Pa., have consolidated into one company, the Speer Carbon Company, with headquarters at Saint Marys. The various subsidiaries henceforth will operate as divisions of Speer Carbon Company.

DRIES SMALL PARTS *Faster—Better...*

DOES IT FOR LESS!

Kreider Dryer with auxiliary gas heating unit (illustrated). Auxiliary steam heating unit available, also standard model without auxiliary heating.

Basket (shown below). Heavy gauge steel woven mesh over steel frame. Capacity, 1140 cu. ins.

Spin-Dries* up to 50 pounds in less than 2 minutes

Simple design . . . careful engineering, sturdy construction assure trouble-free, low-cost maintenance operation. Operates at 625 r.p.m. on less than 1 h.p.

No scarring or marring . . . with Kreider Dryer. Centrifugal force holds parts immovable in basket . . . assures smooth, evenly dried surfaces, long-lasting luster, minimum "rejects".

One man runs it! Standard model Kreider Dryer occupies less than 6 sq. ft. floor space. One man tends . . . loads, unloads . . . keeps production moving, prevents expensive, time-wasting tie-ups.

See for yourself! Write Dept. PL-5290 today for illustrated 4-page folder . . . also addresses of installations near you.

New Holland Machine Co., New Holland, Pa.

***Only 2 simple steps required...**

(1) Operator places wire mesh basketful of small parts in Dryer . . . turns motor "ON."

(2) Operator turns motor "OFF" . . . presses foot brake . . . removes basket.

NEW HOLLAND *KREIDER* DRYER

PLATING FOREMAN—CHEMIST

Excellent position available in metropolitan New York for a chromium and bright nickel "*Specialist*", to assume full charge of the modernly equipped chrome division of a long established job shop. Will be solely responsible for complete operation A to Z, including makeup, adjustment and analyzing solutions, production, rack design, pricing, etc. Permanent position offering good future for right man. Write stating full details, experience, references, and salary requirements. All replies strictly confidential.

Reply to:

P-952-B, PLATING
415 Broad St., Newark 2, N. J.

REAL SALES OPPORTUNITY

Here's a real opportunity for aggressive men to earn more money. Well established basic chemical manufacturer has openings for outstanding sales representatives in the following territories. Wisconsin-Minnesota and New England. Complete line of alkaline and solvent emulsion type metal cleaners. Knowledge of metal finishing, plating, etc., essential. Prefer men with selling experience. Cars furnished. State age, previous experience, other qualifications. All replies will be held strictly confidential. Write

COWLES CHEMICAL COMPANY
Metal Cleaner Department
7016 Euclid Avenue
Cleveland 3, Ohio

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 1109.

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ARDCO, INC.
Chicago 38, Ill.

ARMALITE CO., LTD.
Toronto 6, Canada

CROWN CHEM. & ENGINEERING CO.
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DANIELS PLATING BARREL & SUPPLY CO.
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STANDARD CHEMICAL CO.
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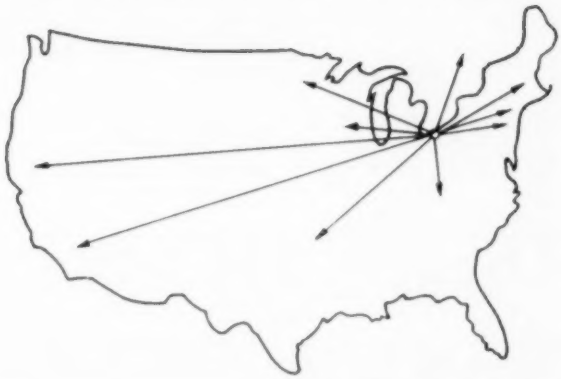
WEAVER EQUIPMENT & SUPPLY CO.
Houston 5, Texas

Distributors of ROHCO PRODUCTS are selected to give you the benefit of years of experience in plating procedures. All ROHCO PRODUCTS are the culmination of creative research on production requirements for the best in plating. They are your assurance of Quality, Service and Superior Plating Performance.

ROHCO



NO-CRO-MIST (Triple Power)—Soluble addition agent to control chrome spray. Proved essential in thousands of gallons of chrome baths.

20XL CADMIUM BRIGHTENER—Absolutely without equal for cadmium plating.

AIRCRAFT BLACK CADMIUM DIP—Simplest and best for the purpose.

100 BARREL ZINC BRIGHTENER—Chrome-like deposits directly from the bath; fastest plating; lowest cost.

303 STILL ZINC BRIGHTENER—Bright, uniform deposits; widest plating range; highest throwing power.

ZINC PURIFIER—Keeps zinc bath in tip-top condition; minimizes brightener consumption.

ROHCO Imperial SILVER BRIGHTENER is far more effective than the usual brighteners; gives lustrous, satin finish; increases production up to 2½ times normal.

NO-FLASH—Minimizes gas explosions in zinc plating and alkaline cleaners.

RINS-AID—Added to rinse tank to repel water; helps prevent staining; saves buffing—all at negligible cost.

HULL CELL EQUIPMENT—Essential to every plant. For bath control to give peak production and quality. Specially designed COMET B-1000 and B-267 Rectifiers for proper Hull Cell tests and General Laboratory use. Model "W" Hull Cell now available for tests at elevated temperature and with agitation. Porcelain Enameled Hull Cells for high temperature with direct heat. The HANGING HULL CELL is a new development designed to make plating tests right in the plating tank, or through the complete sequence of plating operations.

ROHCO CURRENT TESTER is a special oscilloscope designed to detect and correct the hidden troubles of rectifiers which your meters don't show. This is the answer to one important cause of poor plating that has heretofore escaped notice.

ADDITION AGENT PUMP feeds any liquid in continuous, small amounts to as many as four plating tanks.

FORCITE ANODE BASKETS offer the latest and best means for using scrap metal or ball anodes. Two positive, inert, shielded contacts from anode bar to ALL the metal.

R. O. HULL & COMPANY, INC.

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BRASS PLATING BY TRUE BRITE

NEW Free Bulletin on brass plating is now ready. Write or call for your copy.

Test Brass Thickness the new, easy way. Insure uniform plate and avoid rejects. True Brite Brass Thickness Testing is as simple as the cadmium and zinc thickness dropping tests but uses a special reagent.

No shortage of Brass plating chemicals here. True Brite Brass Makeup Solution and True Brite Brass Maintenance Solution are ready for immediate shipment. Simplify your brass plating by using these complete additions.

Copper Concentrate will solve your copper cyanide shortage. Now ready for immediate shipment in any quantity at prices you can afford.

TRUE BRITE CHEMICAL PRODUCTS CO.

P. O. Box 31, Oakville, Conn.

Practical Products for Practical People

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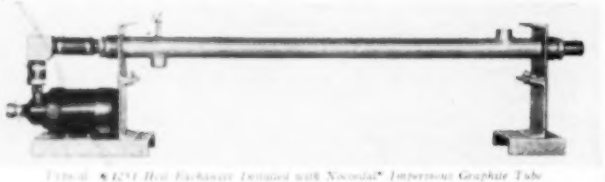
Here's the Economical *"Package Unit"* For Heating and Cooling Your Corrosive Solutions



Typical ★ *1251 Heil Exchanger Installed with Nucedal® Impervious Graphite Tube*

Consider These Advantages of the New No. 1251 Exchanger

- Lower Initial Cost
- Greater Flexibility
- Wide Selection of Tube Materials
- Both Heating and Cooling With the Same Unit

Products of Heil Process Equipment Corp. are sold by all leading Electroplating Jobbers.

The Heil 1251 Exchanger can be purchased with frame, pump and motor, temperature control, and any multiple combination of units.

HEIL PROCESS EQUIPMENT CORP. 12901 Elmwood Ave. Cleveland, Ohio

Other Heil Products Include: Lined Process Tanks • Plastic Fabrications • Lead Anodes • Immersion Heating Units • Lined Pipe and Ducts • Acid-proof maintenance materials.

*Trade Mark

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 1112.

Society News

Graduate Fellowship in Electrochemistry

A study by the Electrochemical Society has shown that college and university chemistry departments have tended to eliminate electrochemistry from their curriculums, and industries and research organizations have failed to make known to academic institutions the growing need for electrochemists.

In line with this survey the University of Michigan Department of Chemistry has announced a graduate fellowship in electrochemistry to promote fundamental research in that field and train more electrochemists for key industrial positions.

Established by General Motors Corporation, Detroit, and approved by the University's Board of Regents, the fellowship provides a cash award of $1800 to the fellowship holder and $1000 to the University to cover tuition, special apparatus and other incidental costs.

It will be offered during 1952-1953 and will be subject to renewal from year to year.

The fellowship will involve fundamental research suitable for a doctoral dissertation and the recipient will be nominated by electrochemistry teachers on the University's Department of Chemistry faculty.

Galvanizers Association Semi-Annual Meeting

The American Hot Dip Galvanizers Association, Inc., will hold its 1952 Semi-Annual Meeting at the Greenbrier Hotel, White Sulphur Springs, West Virginia, on September 24, 25 and 26.

President D. M. Hayes of Wilcox, Crittenden & Company, Inc., Middletown, Conn., will open the meeting with his address of welcome on the morning of September 24. The membership business session will include a report from the Quality Control Committee which is in the process of completing some accelerated destruction tests and their findings are anticipated by the members.

A. S. T. M. New Officers

Announcement of election of new officers by the A. S. T. M. was made at their 50th anniversary meeting.

Dr. H. L. Maxwell of E. I. duPont de Nemours & Company, Inc., Wilmington, Del., is President for 1952-1953. L. Mochel of the Westinghouse Electric Corporation, Philadelphia 13, Pa., is the new Vice-President (term two years). Three-year terms on the Board of Directors will be served by G. B. Gohn, Bell Telephone Laboratories.; W. H. Lutz, Pratt & Lambert, Inc.; H. K. Nason, Monsanto Chemical Company; A. O. Schaefer, Midvale Company, and M. A. Swayze, Lone Star Cement Corporation.

FOR PLATING STEEL

2 Unique Cleaners Improve Results SAVE MONEY!

Diversey No. 909 and No. 12 are two outstanding cleaners specially developed to provide superior finishes on steel surfaces through better, more thorough cleaning performance.

No. 909 and No. 12 are easily applied to a variety of different cleaning routines. No. 909 is a unique heavy duty soak tank cleaner. No. 12 is an electrocleaner for both direct and reverse current. The following case history is typical of the results you can expect through the application of Diversey No. 909 and No. 12.

Case History

Tubular Steel Furniture

PROBLEM: To clean polished steel tubular furniture prior to bright nickel and chromium electroplating.

FORMER PROCESS: Included mineral spirits soak, hand-wipe, spray wash, alkaline soak and two electrocleaning operations in which six men, working steadily, were employed in the hand wiping operation.

PRESENT PROCESS: Diversey No. 909 was substituted for mineral spirits and alkaline soaks and the hand wiping. Diversey No. 12 was used in the electrocleaners.

RESULTS: With Diversey No. 909 there is less smut and grease on the inside of the tubes than with former process thus avoiding contamination of pickle and plating tanks. The cleaner tanks now are dumped every two weeks rather than every week as was formerly necessary. The No. 909 and No. 12 are the only materials this leading finishing plant has found that would eliminate the solvent and hand-wipe operations. The elimination of the hand wiping labor costs results in an estimated savings of $15,000.00 per year. A definite increase in smoothness and luster of the electrodeposit has been obtained with Diversey No. 909.

COMPLETE INFORMATION AVAILABLE *For additional information, including technical bulletins, mail the handy coupon or call your Diversey D-Man. He will be pleased to work with you. Mail the coupon or call today.*

MAIL THIS COUPON FOR MORE INFORMATION

THE DIVERSEY CORPORATION
Metal Industries Department
1820 ROSCOE STREET, CHICAGO 13, ILLINOIS
In Canada: The Diversey Corporation (Canada) Ltd., Lakeshore Road, Port Credit, Ontario.

The Diversey Corporation
Metal Industries Department (D 52)
1820 Roscoe Street, Chicago 13, Ill.

Gentlemen:
Please send me complete information on Diversey No. 909 and No. 12, including new bulletins.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

Cross out those nightmares about special tools and intricate installations

install corrosion resistant

SARAN LINED steel pipe

Because saran lined steel pipe can be cut and threaded in the field without the need for special tools or handling, costly down-time can be reduced to a minimum. Moreover, the dependable, long-term service and excellent corrosion resistance of saran lined steel pipe keep maintenance costs low. Rigidity and pressure strength are additional advantages. Wherever piping with unusual resistance to most chemicals and solvents is indicated, install saran lined steel pipe. Reduce shut-down time and costly equipment replacement. *Saran lined steel pipe is manufactured by The Dow Chemical Company.*

RELATED PRODUCTS

Saran rubber tank lining. An outstanding lining which resists grease, many solvents, acids and other chemicals.

Saran rubber molded parts. Stoppers, diaphragms, various-sized moldings for valves, instruments, etc.

Write to the Distributor:

Saran Lined Pipe Company

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Offices in: New York • Boston • Pittsburgh • Tulsa • Philadelphia • Chicago • Portland • Indianapolis • San Francisco • Houston • Denver • Los Angeles • Seattle • Cleveland • Charleston, S. C. • Toronto • Montreal

Saran Lined Pipe Company,
2415 Burdette Avenue, Ferndale, Michigan

Please send me a copy of your catalog on Saran Lined Pipe, Valves and Fittings.

Name _____ Title _____

Company _____

Address _____

City _____ State _____

SPSG-C

SARAN LINED PIPE a DOW product

Personals

Robert J. Malkmus, Hanson-Van Winkle-Munning Purchasing Agent, retires after more than 29 years' service which dates back to a predecessor company.

Malkmus' association with the electroplating industry is one of the longest on

Malkmus

record, dating back to 1900 when he started with the Eddy Electric Manufacturing Company, manufacturers of low-voltage plating generators. In 1923 he became Purchasing Agent for A. P. Munning & Company, and in 1927 was elevated to the same post in the newly organized Hanson-Van Winkle-Munning Company.

Don Booth has joined the Industrial Department of Wyandotte Chemicals Corporation, Wyandotte, Mich., as an industrial sales supervisor for the state of Wisconsin.

He is a graduate of University of Wisconsin, served five years in the U. S. Army and has had nine years of sales and industrial metal finishing service experience.

Booth

Fancher

Russell C. Fancher was recently transferred by Wyandotte Chemicals Corporation from Detroit to Grand Rapids. Mr. Fancher replaces **Clyde C. Craven,** deceased, who was widely known to the metal finishing industry in Western Michigan.

Mr. Fancher has been a member of the research and development staffs of Packard Motors and Federal Mogul Corporation. He joined Wyandotte Chemicals in 1950 as a specialist in metal finishing operations.

. . . with Wagner Premium Anodes in Every Tank

As primary producers of plating anodes in copper, tin, cadmium, zinc, nickel and white brass, we offer in one source your every anode need. The widespread acceptance of these Wagner *premium* anodes is an indication of the quality and service which you get from Wagner Brothers. More convincing, of course, is actual production, in your own tanks. Remember these names—and these products—for proof of performance:

- FLAT-TOP—Copper and zinc in the distinctive Wagner form
- LECTROCOP—Electrolytic copper slabs
- ISO-CAST—Nickel and copper ovals, tin and cadmium corrugated slabs
- WABRITE—Cadmium and tin balls

Wagner anodes are carried in stock in our branch warehouses or may be purchased through our representatives for shipment from the Detroit plant to any destination. Please call upon the Wagner man in your area for assistance with your plating problems. You'll find him to be qualified by his experience and his *will* to do a better job. He's as near as your 'phone. If you wish to receive periodic advice on prices of plating materials and supplies, use the coupon below.

Wagner BROTHERS INC.

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Wagner Brothers, Inc., 425 Midland, Detroit 3

- ☐ Put me on your mailing list
- ☐ Send general information on Wagner Anodes
- ☐ Have representative call

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

Personals

William Katke has been appointed to the sales-engineering staff of the George L. Nankervis Company in the Detroit area.

Katke

Prior to joining the Nankervis Company, Mr. Katke specialized in the design and manufacture of diaphragm systems and associated electro-plating equipment.

Born in suburban Detroit, Katke attended Kents State University and the University of Michigan.

Russell E. Foster has been appointed Abrasive Sales Engineer of the Clover Manufacturing Company, Norwalk, Conn. He will provide service to both the Company's customers and its distributors and will sell coated abrasives and lapping and grinding compounds in Fairfield County, Conn.

E. S. Gilmore has been appointed District Sales Representative in New England. His headquarters will be near Boston.

Roger A. B. Heap has been assigned to supervision of sales in the State of Connecticut and Western Massachusetts.

After graduating from the Pennsylvania Military College and the Graduate School of Engineering of New York University, Foster became employed as Chief Project Engineer with Raymond Associates, Inc., New York, N. Y., consultants and production engineers. He has had considerable experience in the coated abrasives field.

Formerly associated in a sales capacity with the Minnesota Mining and Manufacturing Company, Gilmore has spent many years in the coated-abrasives industry. He will serve New England users of Clover abrasive papers and cloths and lapping and grinding compounds.

R. J. Keller has been appointed credit manager of The Diversey Corporation, Chicago.

Keller

Reid

Keller joined Diversey five years ago as a sales correspondent for the Central Division, subsequently moving into the Credit Department as a correspondent. He was named assistant manager in 1950.

C. R. Reid, credit manager of The Diversey Corporation, Chicago, has been promoted to the position of assistant to **W. E. Noyes,** vice-president in charge of sales. Reid joined Diversey in 1946 as a credit correspondent, was advanced to assistant manager of the department and then named department manager in 1948.

Dr. Victor Zentner has joined Surface Alloys Engineering Corporation, Los Angeles, Calif., as a research chemist. He

Zentner

was formerly with the National Bureau of Standards, Washington, where he worked on Project No. 9, "Physical Properties of Electrodeposited Nickel".

David Hughes recently joined the industrial sales staff of Simpson Electric Company, 5200 W. Kinzie St., Chicago 44, Ill. Hughes formerly was director in the

ARE YOU CHEATING YOURSELF...

out of brighter, finer zinc and cadmium plating at lower cost by not trying the new ARP Plating Brighteners in your own plant? If you've not tried them call in your Iridite field engineer today for test samples. Or, write direct to

ALLIED RESEARCH PRODUCTS
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REPRESENTATIVES IN PRINCIPAL INDUSTRIAL CITIES. West Coast: L. H. BUTCHER COMPANY

Manufacturers of Iridite Finishes
for Corrosion Resistance and Paint Systems for Non-Ferrous Metals; ARP Plating Chemicals.

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE # 1116.

UNICHROME

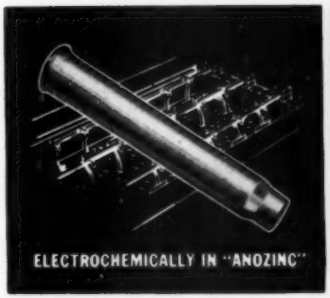
News about

COATINGS for METALS

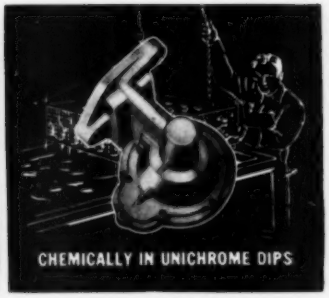
Metallic . . . . . Organic . . . . . Decorative . . . . . Protective

Specifications on corrosion resistance met by these

Two Ways to Chromate-Finish Zinc



ELECTROCHEMICALLY IN "ANOZINC"



CHEMICALLY IN UNICHROME DIPS

■ Government specifications which call for chromate treating of zinc plate, do so to assure protection against corrosion. Several methods of chromate finishing are available to do this job. This gives the user freedom to choose the particular process that's best suited to his product, and offers production or cost-cutting advantages.

Two Unichrome Processes are widely used today because they can not only meet or exceed specifications, but also provide substantial benefits to the user.

A TOUGHER COATING THROUGH ANODIZING

The Anozinc* process, using conventional plating equipment, produces black, yellow or clear chromate type coatings on zinc plated parts by means of current. An exclusive process, it provides a finish with not only the desired corrosion resistance, but also superior toughness while still wet. This means that parts can be handled at once, thereby minimizing the storage and drying space problem.

The Anozinc process can be set up in one continuous automatic cycle with the zinc plating, or for manual operations. Zinc plated steel shell cases are being turned out at a fast clip with this process, as are propeller blades and other vital work.

In forming conversion coatings, chromate treatments remove some of the zinc from the product. Consequently, there is a problem in recessed areas of the work, where zinc plates thinner than it does at the edges. Not with Anozinc, however. An anodizing process, it complements the zinc plating process. Its stripping action is less in recesses where the zinc plate is thin. With a straight chemical dip, more zinc would have to be deposited to compensate for non-selective stripping action.

UNICHROME DIP A SIMPLE PROCESS

Unichrome Dip Finishes, chemically produced, are adaptable for manual or automatic operation. They too inhibit corrosion and withstand exposure. Different solutions produce a black, olive drab, brass-yellow, iridescent yellow or clear chromate coating in 5 seconds to 2 minutes, depending on the solution used. These finishes, integral with the zinc surface, also make excellent bases on which to apply organic coatings.

As straight chemical processes, Unichrome Dips use simple equipment, need no generator or rectifier and minimize installation costs.

Unichrome Dips produce bright, glossy finishes. The black and olive drab finishes can provide the eye appeal of glossy enamel. Clear finishes are bright, and have an appearance similar to chromium.

BOTH ARE ECONOMICAL SOLUTIONS

Anozinc baths have exceptionally long life. Unlike chemical dips, they seldom need to be discarded. In mass production, this feature cuts operating expenses.

Compared with other dips, Unichrome Dips can save money, too. By using a Unichrome Dip instead of their "home made" chromate dip, one well known company cut cost of materials alone by one-third.

Write for Bulletin CC-1, or phone the nearest United Chromium office.

UNITED CHROMIUM, INCORPORATED

100 East 42nd Street, New York 17, N. Y. • Detroit 20, Mich. • Waterbury 20, Conn.
Chicago 4, Ill. • Los Angeles 13, Calif. • In Canada: United Chromium Limited, Toronto, Ont.

Essential Insulations In Hard Chromium Plating

The *right* insulation for stop-off purposes should be easy to apply, stand up through the complete cycle, and strip easily. Unichrome Stop-Off materials meet all these plating plant needs. They include wax-like compounds, quick drying lacquers, vinyl Unichrome Tape. All Unichrome Stop-Offs hold a sharp plating line. Literature available.

CLEAR ENAMEL SAVES THOUSANDS OF DOLLARS

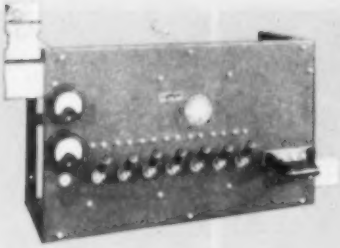
A clear enamel over today's decorative chromium finish gives extra protection against moisture, handling, corrosives. Using a special Unichrome Coating, one well known manufacturer is getting not only superior protection on plated refrigerator shelves, but also greater film thickness at less cost than the coating formerly used. Savings reported for the year: $15,000.

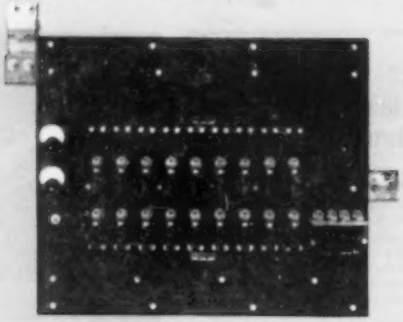
Better Protection Against Chemical Attack

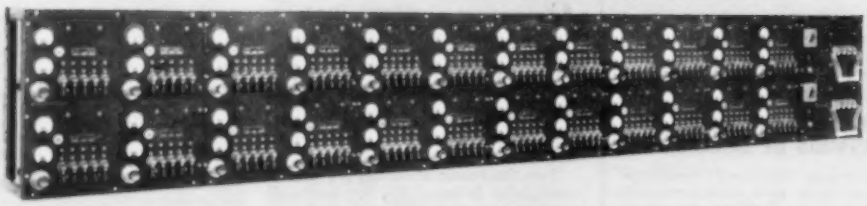
Because Ucilon* Protective Coatings resist many strong chemicals, they're being used today in a wide variety of tough applications. On plating machines, for example. Also on bottling machines and on processing equipment. Use of these coatings means less corrosion and better appearance with less maintenance. Ucilon Coating Systems are available to withstand acids, alkalies, salt solutions, oxidants, moisture, petroleum products, alcohols, fumes and other corrosives. Write for Bulletin MC-4.

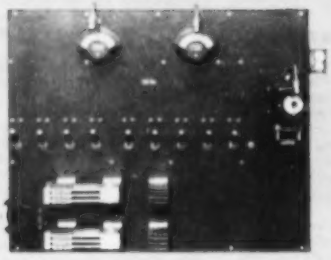
**Trade Mark*

CROWN RHEOSTATS CONTROL PANELS SWITCHES









Pioneers in 1914... and leaders since then in the manufacture of the finest rheostats, control panels, reversing and line cut out switches—all equipped with Crown's exclusive "constant pressure" brush type toggle switches.

Standard sizes 15 to 5000 Amperes—Special units built to specifications. Write for full details.

CROWN RHEOSTAT AND SUPPLY COMPANY

3465 N. KIMBALL AVENUE • CHICAGO 18, ILLINOIS

INDICATE A 1118

Personals

instrument school of the Industrial Training Institute, Chicago. Simpson's five plants in Chicago and Wisconsin make electronic and electrical instruments and testers.

Gordon J. Berry has been elected President of the Electric Products Company. Mr. Berry started at The Electric Products Company in the early 30's after at-

Berry

tending Mercersburg Academy, Cornell and Western Reserve University. Beginning as a test engineer, he progressed through the service organization, design engineering and sales engineering to his recent position of vice president in charge of sales.

Thomas J. Menzel has been promoted to the position of Plating Chemist by the Hanson-Van Winkle-Munning Company, Matawan, N. J. In his new position he will be responsible for all experimental and

Menzel

process plating in H-VW-M's new plating laboratory. For the past several years he has been in charge of analytical work and customer's service work.

Menzel has a B.S. degree from Hudson College of St. Peters College, Jersey City, and has completed special courses at New York University. His work in the electrochemical field began when he joined the Hanson-Van Winkle-Munning Company in 1943 as a chemist.

O. B. Wilson has been made Field Sales Manager for the Industrial Division of Minneapolis-Honeywell Regulator Company. He succeeds **William H. Steinkamp**, who was recently made General Sales Manager of the Division.

Wilson joined the Brown Division in 1923. He later became Industrial Manager in Chicago, New York and other offices. He was made Industrial Manager for the eastern sales region in 1948 when he transferred from the New York branch to the company's Philadelphia headquarters.

A graduate of New York University in 1928, Steinkamp joined the Brown Division in 1930 as Field Sales Engineer, and has represented the Brown Division in New York, Buffalo, Cleveland and Pittsburgh, where he served as Branch Manager. He has been Field Sales Manager since 1943.

John D. Seaver has been named assistant manager of engineering of the General Electric Company's Industrial Heating Department, and will make his headquarters at Schenectady, N. Y. He has been with G. E. on a variety of engineering assignments since receiving his B.S. degree in physical metallurgy from the Massachusetts Institute of Technology in 1935.

Harry R. Nichols and **Edward J. Roach** have been assigned to the East Orange, N. J., office of the Industrial Division of Minneapolis-Honeywell Regulator Company; **John J. Heavey** to Syracuse; **John M. Caylor** to Harrisburg, Pa.; **Jack M. Fettig, Donald C. Roberge** and **John C. Sharp** to Detroit; **Vendel W. Immel** to Saginaw, Mich.; **Alexander W. Spears** to Pittsburgh; **Axel H. Magnuson, D. J. McDowell,** and **Harry W. Spongberg** to Chicago; **Wilbur J. Smith** to Milwaukee; **Robert D. Werckle** to Peoria; **Leland K. Smith** to Davenport; **John S. Hafling** to Louisville; **Glenn Cullen** to Billings, Mont.; **Richard W. Polgreen** to St. Paul and Minneapolis; **John H. Tenison** to Houston; **Calvin L. Perilloux** to New Orleans; **Robert W. Smith**

Your Best Buy!

#74

BURRING COMPOUND

For De-Burring All Metals

Write Dept. B for Samples

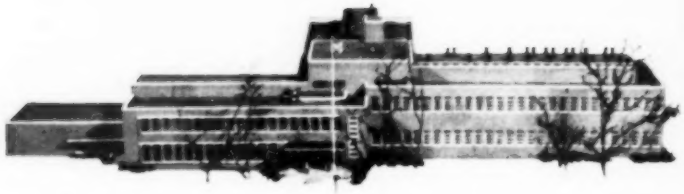
REPRESENTATION FROM COAST TO COAST

The BUCKINGHAM PRODUCTS Co.

14100 FULLERTON AVE. • DETROIT 27, MICH.

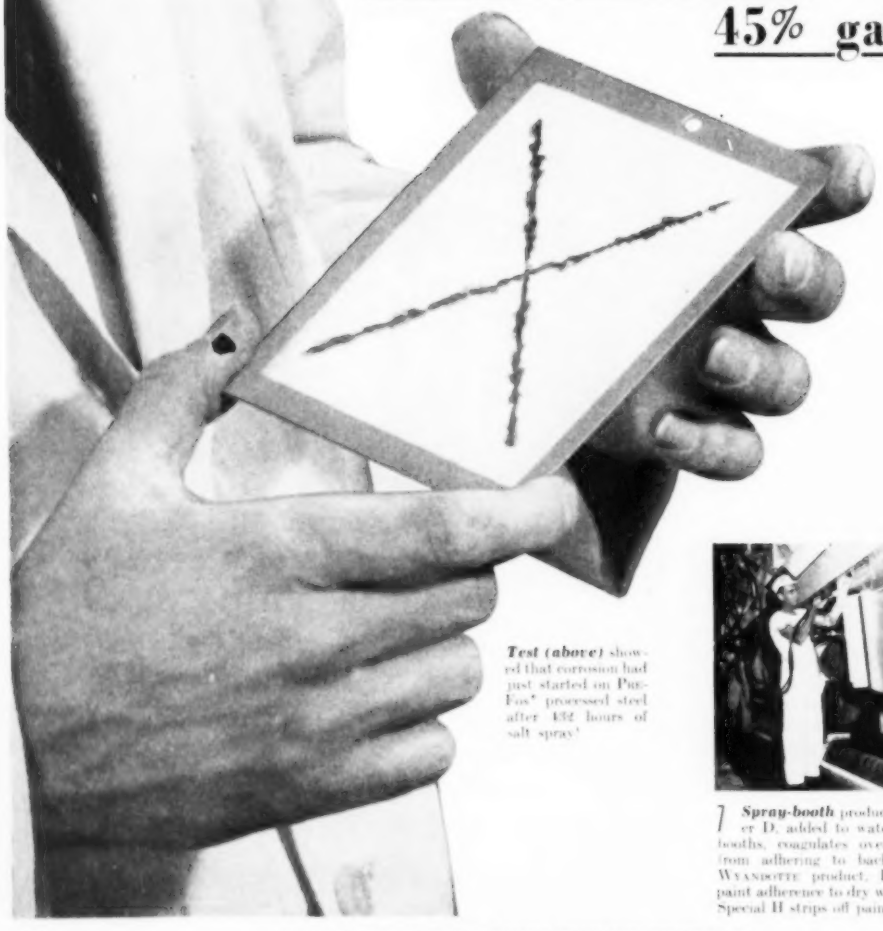
FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 1119.

WYANDOTTE CHEMICALS



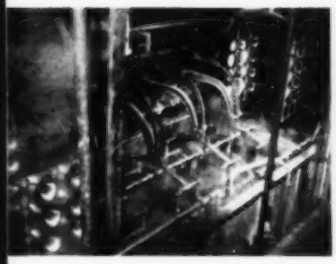
New WYANDOTTE CHEMICALS research building (above) houses finest facilities in the industry for testing and development of cleaning products and processes for Aviation, Railway and Metal Finishing Industries.

Read these FACTS behind 45% gain in

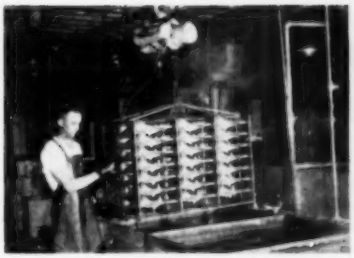


Test (above) showed that corrosion had just started on PRE-FOS* processed steel after 438 hours of salt spray!

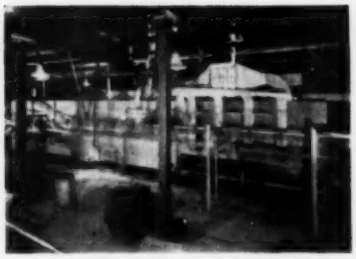
Spray-booth products. Metal Cleaner D, added to water in water-wash booths, coagulates overspray, keeps it from adhering to back wall. Another WYANDOTTE product, Hedral, prevents paint adherence to dry walls. WYANDOTTE Special H strips off paint.



2 ***Fewer rejects***—A parts manufacturer who uses WYANDOTTE F.S.* for electrocleaning of steel parts prior to electroplating, reported fewer rejects due to incomplete cleaning—calls F.S. "thorough and economical to use." You can profit, too, with WYANDOTTE products!



3 ***Wide line*** of cleaners includes W.L.G.,* a product with a balanced formula of exceptional detergency, long life, versatility (cleans copper, brass, bronze as well as ferrous metals). W.L.G. is also used for heavy soak-tank, barrel, and rotary-washer cleaning, low-pressure spray washing.



4 ***Power washing*** — WYANDOTTE Metal Cleaner No. 38 puts added power in power washing machines . . . has high detergency, is used for cleaning ferrous and non-ferrous metals. Versatile, economical (through long solution life). Ask your helpful WYANDOTTE service representative to demonstrate.

Wyandotte's amazing cleaning product sales!

Wyandotte Chemicals is the leader—the world's largest manufacturer of specialized cleaning products for business and industry.

And Wyandotte sales climbed 45% in the past 2 years . . . are still going up, UP, UP!

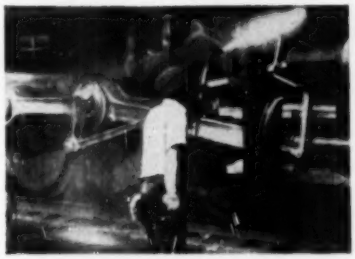
Why? Because more and more industries have learned that *with the leader, Wyandotte, they get advantages they could find nowhere else:* a complete line of high-quality products for every cleaning need; skilled technical service, and research most capable of solving *new* cleaning problems; dependable supply of raw materials from *our own* salt and coal mines and limestone quarries; more than half a century of the broadest possible cleaning experience . . . *all of which can save you money, give you better cleaning!*

May we help you? Write *Wyandotte Chemicals Corporation, Wyandotte, Michigan; also Los Angeles 12, California.*

*REG. U.S. PAT. OFF.

Wyandotte CHEMICALS

Helpful service representatives in 138 cities in the United States and Canada



5 ***Railroad cleaning***—Products for every job include free-rinsing, solvent emulsion cleaner, WYANDOTTE-20. One of many WYANDOTTE railroad products, No. 20 does a uniformly fast, thorough job of flushing off heavy grease, oils. The WYANDOTTE line includes vat cleaners, interior and exterior car cleaners, waxes.

6 ***Aircraft***—WYANDOTTE line includes paint strippers (Sprazee), fuel-tank descalants, carbon removers, degreasers; brightening, polishing and corrosion treatments; conveyor power washing, vapor steam cleaning, exterior washing, and electrocleaners; aluminum cleaners and deoxidizers for spot-weld preparation.

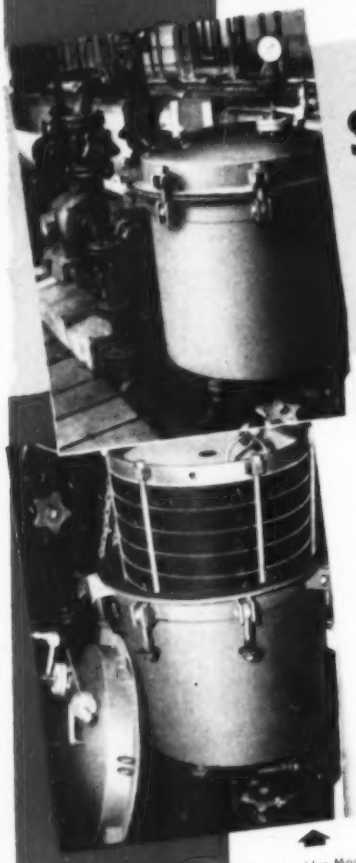
8 ***For steam*** and hot-water pressure cleaning: WYANDOTTE supplies Fairtrex No. 1 for *medium*, and Special H for *heavy* deposits of oil and grease; Altrex*, a mild, noncorrosive product for light oils and grease. Complete line, too, for maintenance cleaning.

9 ***Floor absorbent***—Zorball is a really different product, almost mandatory wherever water, oil, grease, chemicals accumulate on floor. Doesn't break down, blow or track . . . remains skidproof when saturated . . . can be used again after drying. Prevents accidents. Saves dollars.

CLEANING THE WORLD

World's largest manufacturer of specialized cleaning products for business and industry

No repairs or maintenance in over 17,000 hours of 'round-the-clock operation



. . . yet this SPARKLER Horizontal Plate FILTER is still going strong

The kind of service Sparkler Horizontal Plate Filters have given the Gillette Safety Razor Company—efficient and trouble-free, even under most extreme conditions—is the kind of service that is vital to *every* filtering operation.

For example: A rubber-lined Sparkler Model 8-18 filter is used by Gillette in the continuous filtration of a 1000-gallon bright nickel plating solution. Now operating for approximately two years, this filter has been on a 24 hours a day, 7 days a week schedule — without any loss of operating time for repairs or maintenance. Also used in periodic batch carbon treatments of nickel solutions this unit, according to Gillette technicians, consistently delivers a brilliantly clear effluent, even though the plates may be packed solid.

Another Sparkler Filter employed by Gillette is a Model 8-6, stainless steel, portable unit. Used exclusively for cyanide type plating solutions, this Model 8-6 has proved particularly valuable for Gillette's gold plating operations since the patented Sparkler Scavenger Plate assures minimum loss of precious gold solution. Now operating almost six months for at least 2 hours daily, its performance has been satisfactory in every respect.

Top: Sparkler Model 8-18 filter shown installed in Gillette's plating department. Above: Same filter, with filter plate assembly being removed for cleaning.

Left: Sparkler Model 8-6 stainless steel filter. This portable unit is used by Gillette to filter gold plating solutions.

Our Engineering Department (with more than 25 years' experience in every phase of filtration) is available for consultation without charge.

SPARKLER MANUFACTURING CO.
MUNDELEIN, ILLINOIS

(PAID) FOR FURTHER INFORMATION, USE READER SERVICE CARD. INDICATE A 1121.

Personals

to Kansas City; **Jack T. Teed** to Tulsa; **Max R. Curtis** to Salt Lake City; **Richard E. Roberts** and **Roland T. Williams** to Los Angeles; and **Harvey L. Tibbals** to San Francisco.

These twenty-six sales engineers have recently completed a 13-weeks intensive training course in instrument maintenance.

Dr. Dodd S. Carr is now associated with Bart Products, Inc. of Belleville, N. J., as assistant director of electrochemical development. He is in charge of all chemical and electrochemical phases of the electroforming operations of the company and will work on the development of new plating processes and techniques.

Carr

Dr. Carr received his Doctorate in Chemical Engineering from The Johns Hopkins University and was formerly connected with the International Nickel Company Research Laboratory.

Myron Ceresa has been appointed manager of the Electroplating Projects Section of the Westinghouse Electric Corporation, East Pittsburgh.

Ceresa

Mr. Ceresa joined Westinghouse in 1937 following his graduation from the Pennsylvania State College. An engineer at the Westinghouse Research Laboratories until 1941, he transferred to the Materials Engineering Department at East Pittsburgh, and then became a member of the Electroplating Projects Section in 1947.

Obituary

✣ **Chester H. Fisher**, 50, secretary and treasurer of Cowles Chemical Company, Cleveland, Ohio, died suddenly July 24 of a heart attack at his home in Brecksville, Ohio. Mr. Fisher came with Cowles in 1929, was elected treasurer in 1943 and secretary in 1952.

TIPS FOR BETTER PLATING—FROM DU PONT

Answers to your questions . . . suggestions for improving techniques

REMOVAL OF IMPURITIES from the plating bath and proper adjustment of the bath itself contribute heavily to successful plating operations. The questions below indicate the interest of platers in improving bath efficiency and are typical of the many inquiries received by Du Pont. Perhaps the answer to *your* plating problem is printed here. If not, write directly to Du Pont Plating Service, Electrochemicals Department, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.

Q. How is plating efficiency affected by incorrect "Cadalyte" bath preparations?

A. Incorrect proportions of cadmium, total sodium cyanide, or caustic soda result in varying degrees of decreased width and brightness of usable current range: **1.** *High* cadmium (above 5 oz. gal.) results in both a high bright and dull low current density range. **2.** *Low* cadmium (below 2 oz. gal.) produces low bright current density range with reduced cathode efficiency. High current density range is "burnt."

3. *High* cyanide (above 20 oz. gal. for 4.5 oz. gal. cadmium, or above 10 oz. gal. for 2.25 oz. gal. cadmium) lowers cathode efficiency. Bright range is shifted toward low current densities. **4.** *Low* cyanide (below 15 oz. gal. for 4.5 oz. gal. cadmium, or below 7.5 oz. gal. for 2.25 oz. gal. cadmium) gives narrow bright range and dull deposits at both high and low current densities. **5.** *High* caustic soda (above 4 oz. gal.) yields low reflectivity or brightness. **6.** *Low* caustic soda (below 2 oz. gal.) causes excessive anode polarization with poor conductivity and tends to produce pitted deposits.

Q. Would you please list the causes of rough deposits from "Zin-O-Lyte" baths with suggestions for correcting each condition?

A.

CAUSE	REMEDY
1. Foreign particles floating in bath.	1. Allow bath to settle, decant or filter.
2. Excessive anode sludge.	2. Increase anode current density. Purify bath if sludge is caused by contaminating metals.
3. Insufficient cleaning.	3. Investigate cleaning, especially on polished steel.
4. Bath contaminated with heavy metals.	4. Purify with sodium polysulfide or zinc dust.
5. Drag-over of cleaner or acid.	5. Improve rinsing.
6. Improper chemical composition.	6. Analyze and adjust bath. Observe proper operating conditions.

Q. Please review the effects of heavy metal impurities in "Cadalyte" baths. How can these impurities be removed?

A. Lead, thallium, copper, tin and chromium are the most common impurities and have the following effects: **1.** Lead and thallium produce dull, slate-colored deposits and low, narrow bright current density range. **2.** Copper causes a film over low density areas. **3.** Tin gives dull, streaky deposits. **4.** Chromium causes blistering with little or no deposit obtained under 25 A./SF.

Effects of lead, thallium and tin may be corrected by either low current density electrolysis or treatment with cadmium sponge or high purity zinc dust. Chromium removal requires additions of sodium hydrosulfite—repeated if necessary. However, there is no known method of removing copper from cadmium solutions. Nickel plating the busbars is a preventive measure. And bright dipping finished plate will remove the copper film providing copper concentration is low.

FOR BRILLIANT CADMIUM PLATING —AT LOW COST

Bright, lustrous cadmium deposits of high uniformity can be economically produced with Du Pont "Cadalyte"—the complete plating salt.

"CADALYTE" contains all chemicals required for a modern efficient plating bath. Extremely bright deposits are obtained directly from the bath at high current densities. Bath is easy to operate, easy to maintain . . . has excellent throwing power.

"CADALYTE" BRIGHTENER holds the high covering power of the "Cadalyte" bath at its peak . . . assures uniformity and brilliance of deposits. Brightener may be added separately, or added with sodium cyanide in "Cadalyte" Maintenance Compound.

FOR FURTHER INFORMATION on "Cadalyte" or technical help in your electroplating program, ask your Du Pont technical representative or call or write our nearest district office. E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Dept., Wilmington 98, Delaware.

District Offices: Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, El Monte (Calif.), New York, Philadelphia

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DU PONT

150th Anniversary

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Put them INTO your Plating!

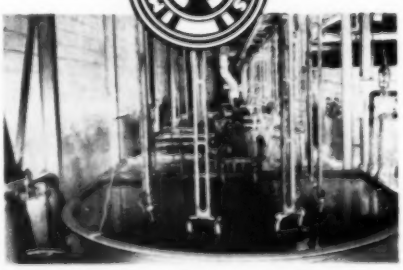
Get more and better plating for less

With complete control of the sequence plus the conveyor handling of the parts, a Meaker machine gives greater production, reduced costs, uniform predetermined quality and less turnover in personnel due to better working conditions. Meaker equipment is tailored to the job requirements in plating, anodizing, pickling and cleaning, bonderizing or other processes involving a sequence of washes, rinses, and dips. Get full particulars from The Meaker Company, 1629 South 55th Avenue, Chicago 50, Illinois.

MEAKER

- Full Automatic and Semi-Automatic Electroplating Equipment
- Strip Steel Plating Equipment
- Wire Galvanizing Equipment
- Strip Steel Electrocleaning Lines
- Pickling Machines
- Processing Conveyors
- Motor Generators for Plating
- Rectifiers for Plating

MEAKER PRODUCTS



Meaker Return-Type Automatic Plating Machine

PLATING EQUIPMENT FOR OVER 50 YEARS

(XXX) FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 1123.

Trade Literature

L—856. Equipment Catalog—International Engineering, Inc., Dayton, Ohio, have recently published an 8-page booklet detailing specifications on their line of portable mixers, agitators, filter presses, pumps and ball and jar mills. For your copy of Bulletin No. 77, use Reader Service Card.

L—857. New Welding Analyzer—The new Brush Welding Analyzer, which graphically records welding current, electrode force, and other variables in both single and three-phase resistance welding, is described in a single sheet catalog of The Brush Development Company, 3405 Perkins Ave., Cleveland 14, Ohio. For your copy, use Reader Service Card.

L—858. Sewage & Waste Disposal Handbooks—Planning and making industrial waste surveys is a "how-to-do-it" manual for the conduct of a liquid-waste study in a manufacturing plant. It was prepared by the Metal-Finishing Industry Action Committee of the Ohio River Valley Water Sanitation Commission as a practical handbook describing methods of measuring flow volume, obtaining representative samples and calculating waste loads.

How to get sewage treatment plants in Ohio is a guidebook describing recommended engineering and financial procedures for initiating a project. Written primarily for municipal councilmen, mayors, service directors and fiscal officers, it provides a step-by-step explanation of legal requirements in Ohio for sewage disposal, the manner in which an engineer is retained, how financing is planned and the conduct of other practical measures to expedite construction. Copies of either book at $1.00 each are obtainable from the Ohio State Department of Health, State Office Building, Columbus 15, Ohio, or the Ohio River Valley Water Sanitation Commission, 414 Walnut St., Cincinnati 2, Ohio.

L—859. New Literature—The Apothecaries Hall Company of Waterbury, Conn., has just issued a series of six bulletins describing latest developments from their finishing laboratories.

B-1: Stainless steel buffing compound
B-2: Greaseless compound
B-3: Liquid buffing compound
B-4: Burnishing compound
B-5: Cutting compound
B-6: Water displacing liquid

These bulletins may be obtained by use of Reader Service Card.

L—860. Industrial Conservation—The office of Public Information, DPA, has

issued a timely 16-page guide to conservation engineering practices. For your copy of this instructive booklet, "Industrial Conservation", write to Conservation Division, Defense Production Administration, Washington 25, D. C.

L—861. Turco Metals Booklet—Turco Products, Inc., Los Angeles 54, Calif., announce the release of a new metals booklet which outlines most of the chemical processing operations that are necessary in the metal-working industry and describes tested and proved compounds that suit each operation.

Among the valuable charts included in the booklet is a two-page "Phosphating Reference Chart" which describes and tells how to use phosphating materials that meet JAN-C-490 specifications. For your copy of Booklet A-33 use Reader Service Card.

L—862. Spray Booth Plastic Coating—A two-color leaflet is being distributed by Detrex Corporation, Detroit 32, Mich., which describes the use and application of Vinecote, a new vinyl-type coating for paint spray booths. The coating is easily peeled off, taking with it all paint overspray, to give quick, low cost maintenance. For your copy use Reader Service Card.

L—863. Cleaning and Phosphate Coating Compound—A leaflet describing Detrex 79, a compound used for cleaning and imparting a fine-grained phosphate coating to steel parts to provide a good paint bond, has been issued by Detrex Corporation, Detroit, Mich. For your copy use Reader Service Card.

L—864. New Alkaline Tin-Lead Stripper—A new alkaline chemical for rapid dissolving of tin, lead and tin-lead alloys has been announced by Enthone, Inc., New Haven, Conn. This material is used in water in a concentration of 1 lb/gal at 160–180° F. The stripping action on both tin and lead is fast and thicknesses of the order of 0.005 inch to 0.010 inch are removed in one hour with no attack upon base metals, such as copper, brass, bronze, steel and stainless steels. The material is kept in steel or stainless steel containers and does not deteriorate with age. Informative literature is available on request. Use Reader Service Card.

L—865. Automatic Melting-Point Instrument—For the first time temperature-optical transmission studies and automatic determination of melting-point, solidification point, softening point, dehydration point, decomposition point, etc., can be accomplished rapidly, accurately, and reproducibly by means of the new Aminco-Furst Meltometer.

It performs many determinations automatically, measures sample size for dupli-

chromium chemicals bearing
this trademark
are preferred by leaders in the metal finishing industry

MUTUAL CHEMICAL CO. OF AMERICA
SINCE 1845
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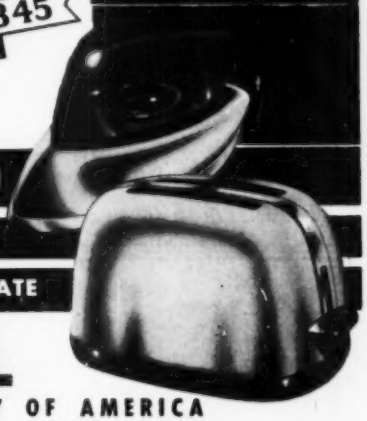

CHROMIC ACID
SODIUM BICHROMATE
POTASSIUM BICHROMATE

MUTUAL
CHEMICAL COMPANY OF AMERICA
270 Madison Avenue • New York 16, N. Y.

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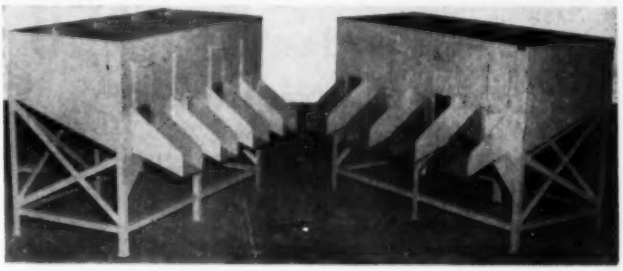


No sags, buckles or bends

WHEN YOUR accessory and related equipment is fabricated by Storts, you will notice the same fine dimensional accuracy, the same square and trim appearance that you get in Stortswelded plating, cleaning and rinsing tanks. Also, the same complete fusion, sound deposits and structural integrity in all the welds. No matter what the fabrication is, there is only one standard of quality for all of the welding that is done in our shops.

42 STONE STREET — STORTS WELDING COMPANY INCORPORATED — MERIDEN, CONN.

Manufacturers of Welded Fabrications to Specification

FOR FURTHER INFORMATION, USE READER SERVICE CARD: INDICATE A 1125.

cation, and permits, for the first time, obtaining a reference value on amorphous materials with "no melting point".

Only microscopic amounts of sample are required for test. Upon completion of a test, the sample will be in a solid state for observation, storage, or repeated tests. The voltage stabilized, a-c operated unit is compact and portable (weighs 25 lbs.) and has a maximum range of 0° to 500° C. American Instrument Company, Inc., Silver Spring, Md., fully describes their Meltometer in Bulletin 2205-310. For your copy use Reader Service Card.

I.—866. New Selenium Rectifier Catalog—The Richardson-Allen Corporation, College Point, N. Y., a manufacturing affiliate of Wesley Block & Company, New York, N. Y., announce the publication of new catalog sheets on their line of selenium rectifiers. These descriptive data sheets on units for electroplating, anodizing, industrial battery charging and power conversion are available through use of Reader Service Card.

I.—867. pH Booklet—A review of *p*H theory and its practical applications in industrial measurement and control are contained in Bulletin 430-1, issued by The Foxboro Company, Foxboro, Mass. Featuring a step-by-step explanation of the units employed in the *p*H control cycle, the 16-page bulletin is profusely illustrated to show instrument details, typical process applications and accessory equipment. Copies will be sent on request. Use Reader Service Card.

I.—868. Nickel Plating with Insoluble Anodes—A 12-page reprint by the International Nickel Company, Inc., describes advantages and limitations of using a chloride-free electrolyte at high current density for industrial electrodeposition and electro-forming of complicated shapes. Presents a new way of concurrent replenishment of the electrolyte using commercially pure nickel. 12 tables and illustrations indicate economic power consumption; optimum *p*H, current densities and rate of electrolyte circulation. For your copy use Reader Service Card.

I.—869. Engineering Electroforming—A 6-page reprint by the International Nickel Company, Inc., describes the unique process which places a new tool at the design engineers' disposal and which makes possible the simplification of many construction problems. The three commonly electroformed metals, copper, iron and nickel are compared. How expensive, where and when to use are discussed and typical applications are suggested. Factors affecting production and designing of matrices are presented. It points out practically every plating shop has all the equipment to do electroforming, which may be done on metal, wood, plastics, rubber, wax or plaster to high dimensional accuracy and fine internal surface finish. For your copy use Reader Service Card.

I.—870. Protective Coating Catalog—Metalweld, Inc., 26th and Hunting Park Ave., Philadelphia 29, Pa., have just issued a 12-page catalog outlining their Protective Coating, Rubber Lining, Metal-spraying, Welding and Sandblasting Services for industry. For your copy of this informative catalog use Reader Service Card.

I.—871. Corrosion-Resistant Equipment—A four-page circular which gives a general outline of Agilide (unplasticized Polyvinyl Chloride) corrosion-resistant equipment and products, manufactured by the American Agile Corporation, of Maple Heights, Ohio, is available to readers. For your copy use Reader Service Card.

I.—872. Polishing and Buffing Cost Analysis Chart—E. Reed Burns Manufacturing Corporation, 40 Withers St., Brooklyn 11, N. Y., makers of polishing and buffing compounds announce a cost analysis check chart for accurately computing the cost of polishing and buffing operations.

To test-compare the cost of Reed Burns compounds with those you are now using, samples may be had upon request. In testing the two compounds, it is necessary to subject them to the same identical spindle speeds, wheel diameters and other operating conditions. For copies of the cost analysis check chart and samples use Reader Service Card, and specify material worked, diameter and spindle speed and type of wheel finish desired.

I.—873. Guide to Pump Applications—A new type of reference chart on small pump applications has just been devel-

Experts
Agree
On
NARACO
PLATING RACKS AND FIXTURES
You don't have to be a super sleuth to discover the real value of NARACO Plating Racks and Fixtures.
From design through to the finished construction NARACO guarantees you a fixture engineered to do your particular job. It is this record of dependable service and progressiveness that has brought plating experts to agree on the best . . . NARACO.
For immediate help on any of your specialized defense finishes such as: Anodizing, Indium or Lead Plating—call your nearest NARACO factory listed below.
NARACO
National Rack Co., Inc.
179-181 Madison Street, Paterson, N. J.
American Rack Co., Inc.
4632 West 21st Place Cicero, Ill.
Imperial Plating Rack Co., Inc.
1613 Industrial Ave., Flint, Mich.
Plant #2, 1008 East Ten Mile Rd., Hazel Park, Mich.

SEYMOUR

NICKEL ANODES

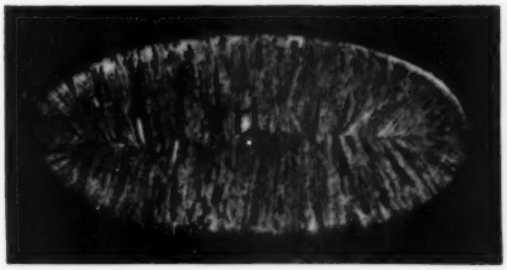
GRAINS THAT INTERLOCK

The Effective Remedy for Intercrystalline Corrosion

LOOSE nickel in high acid or low pH baths results from intercrystalline corrosion, which isolates the grains before they have a chance to dissolve. This is practically eliminated in our "Seycast" 99%+ Pure Cast Nickel Anodes. Here the long, narrow grains extend to a common center. (See cross-section below.) As the acid can penetrate but a short distance, the grains tend to remain in place the entire corrosion cycle.

The envelope formed during corrosion is soft, the sludge extremely small per pound of anode, the particles too large to penetrate the bag . . . assuring effective protection against rough plate in high current density baths.

Seymour "Seycast" Nickel Anodes, though designed for Bright Nickel baths, work perfectly in any hot Watts bath having a pH of 4.5 electrometric or lower. Write for further details.



THE SEYMOUR MANUFACTURING CO., SEYMOUR, CONN.

NICKEL, COPPER, BRASS, BRONZE, ZINC ANODES · BRIGHT NICKEL

Trade Literature

oped by Tuthill Pump Company, Chicago.

In one convenient table (letterhead size), this guide lists the various types of Tuthill pumps, the services for which each is built, the performance characteristics, types of packing, styles of mounting, and features that distinguish each model. Thus, selection of the proper pump for the purpose is simplified, it is stated. Copies of this helpful reference table are available through use of Reader Service Card.

L—874. "Parco Black" — A new jet black finish for iron and steel, having ten times the corrosion resistance of conventional blacks, has been developed by Parker Rust Proof Company.

The new product is used in water solution at low temperatures. Parts to be treated are immersed for 15 to 30 minutes in the processing bath, then are rinsed and dried. After oiling or waxing, the deep black, durable finish is ready for service.

Advantages of Parco Black are several: The processing bath is non-caustic, extremely simple to build and easy to control. Operating temperatures are much lower than those required for other widely used "black" processes. Operating cost studies show excellent production economies. Technical bulletin on Parco Black may be secured by using Reader Service Card.

L—875. Water Purity Meter—The Barnstead Still & Sterilizer Company announces the publication of a new Bulletin No. 125 which describes the new Barnstead Purity Meter, an electronic testing device for determining the purity of either distilled or demineralized water.

The instrument gives readings directly in parts-per-million. A conversion table, mounted on the side, shows the equivalent resistance and conductance.

A section of the bulletin is devoted to the Barnstead Conductivity Diverter, an automatic control device. Operated by a conductivity cell in the pure water line, this special controller-type Purity Meter will permit only water of predetermined purity to enter the storage tank. For your copy of Bulletin No. 125 use Reader Service Card.

L—876. Phenolic Plastic Foam Packing—The advantages and methods of packing objects in foamed phenolic plastic are detailed in a new eight-page booklet published by Bakelite Company, a Division of Union Carbide and Carbon Corporation.

Copies of this booklet may be obtained by using Reader Service Card.

L—877. "Tin Research Institute Report for 1951"—The annual Report of the Tin Research Institute for 1951 describes a new tin-nickel electroplate which is compared with chromium, an (80/20) tin-zinc alloy, aluminum-tin bearing alloys, tin-plate investigations, a new pewter that can be hardened by heat-treatment, and concludes with a list of 12 publications issued for the first time during 1951.

Copies of this publication are available, without charge, from Tin Research Institute, Fraser Road, Perivale, Greenford, Middlesex, England, or Tin Research Institute, Inc., 492 W. Sixth Ave., Columbus 1, Ohio, or use Reader Service Card.

L—878. New Materials Handling System—Said to be the only materials handling system of its kind in the country, and employing hardwood construction, the Wesling Box Control System offers simplicity, flexibility, and economy of operation. The system is based on a master hardwood unit with inside working dimensions 24 in long by 13½ in wide by 2⅜ in deep. It is claimed the boxes are never obsoleted because of changes in the size of parts being produced because each unit can be rearranged and adapted to the new parts in a matter of minutes. For full details use Reader Service Card.

L—879. New Aluminum-Plating Process—A practical process for electrodepositing aluminum at room temperature recently developed by D. E. Couch and Abner Brenner of the National Bureau of Standards is described.

The history of previous aluminum plating is reviewed and composition, operating conditions and characteristics of the plating cell of the new process are discussed in detail along with a description of properties of the deposited aluminum. For further details write to the National Bureau of Standards, U. S. Department of Commerce, Washington 25, D. C.

CLEANING

CASE STUDY—PRECLEANING PRIOR TO ELECTROCLEANING

Problem: Removing buffing compounds, cutting oil and general shop dirt from hand tool parts.

Base Surface: Steel and brass.

Preceding Operation: Parts are drilled, ground, threaded and buffed depending upon the nature of the parts.

Subsequent Operation: Parts are electrocleaned and plated.

Former Method: Parts were put in racks, then soaked for a few minutes in cold, ready-mixed emulsion cleaner used straight, costing $1.00 per gallon. Racked parts then cold water spray rinsed.

MAGNUS METHOD: Magnusol concentrate mixed 1 to 8 with safety solvent. Parts soaked for 1 to 2 minutes in this solution followed by cold water spray rinse.

Comparison: Parts are now cleaned more thoroughly and quickly. Plating results greatly improved . . . rejects eliminated. Cost reduced to ⅓ of former method.

For complete information, write for Magnus Emulso-Clean bulletin.

MAGNUS CHEMICAL CO. • 41 South Ave., Garwood, N. J.
In Canada — Magnus Chemicals, Ltd., Montreal.
Service representatives in principal cities.

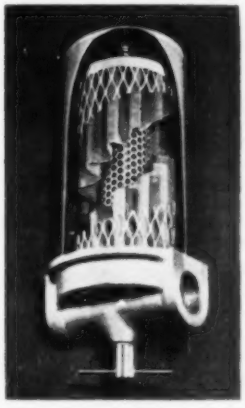
Magnus
CLEANERS • EQUIPMENT • METHODS

Equipment and Supplies

E—925. Liquid Neoprene—Atlas Mineral Products Company announces Neelium, a new high-solids liquid neoprene solution which can be readily brushed and cured at ordinary temperatures to form a thick resilient protective film. This coating has been designed specifically as an industrial maintenance coating with the object of producing a high quality coating of maximum thickness with a minimum amount of labor. Neelium is freshly compounded with accelerator and brush applied over a properly prepared surface primed with a neoprene-base primer. Since it is based on neoprene, it is characterized by excellent resistance to acids, alkalies, oils, aliphatic hydrocarbons, sunlight and weathering, and unlike previously available low solids liquid neoprene maintenance coatings has a solids content of greater than 60 per cent. Comparative tests have shown the resistance against erosion of this new neoprene base material to be superior to rubber and low viscosity liquid neoprene. For further information, use Reader Service Card.

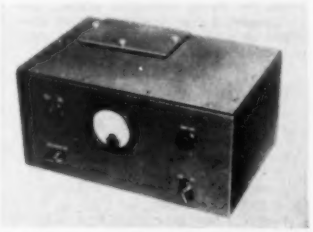
E—926. New Water Filter—Marvel synclinal filters previously used in low pressure oil recirculating systems are now produced for filtering water.

No changes have been made in the basic design. Line types still operate in any position and may be serviced without disturbing pipe connections. Both sump and line type models may be disassembled, cleaned and reassembled on the spot by any workman. The balanced synclinal design provides maximum filtering area with a large capacity for accumulating filtered out matter, thus allowing longer periods of operations between cleanings. Complete engineering data on the filters for either oil, water or other liquids may be had through use of Reader Service Card.

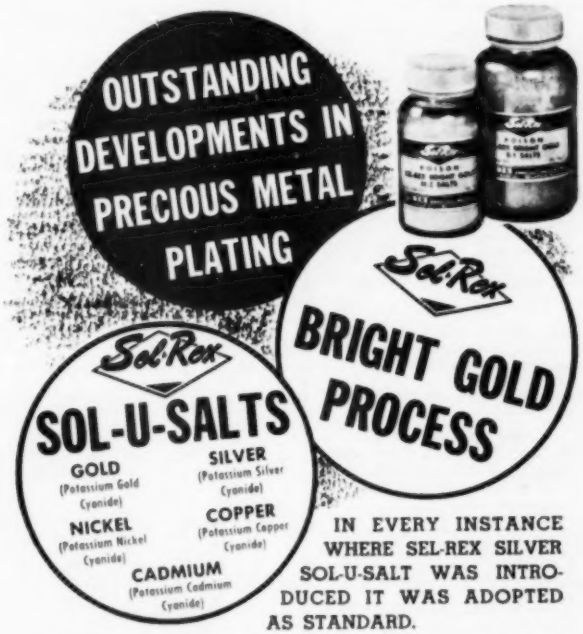


E—927. Roto-Finish Improves Chip Line—According to an announcement by the Roto-Finish Company, Kalamazoo, Mich., their abrasive chip line has again been expanded and improved to extend the applications of the Roto-Finish equipment, materials and processes. The Roto-Finish processing media is now divided into four general classifications with each type available in many sizes: Grinding chips for heavy duty service, britchoning chips for light deburring applications, Coruloy E chips, a natural fast cutting short time cycle material and Coruloy A chips, a synthetic rapid working premium grade material. For complete information use Reader Service Card.

E—928. Flow Colorimeter—Beckman Instruments, Inc., has announced a new flow colorimeter which greatly simplifies the continuous analysis and control of flowing or static streams in liquid or gaseous processes. It is ideal for the continuous analysis of chromate ion concentration in electroplating solutions . . .



for the continuous indication of color and turbidity in municipal and industrial waters . . . for monitoring poisonous gases . . . and many other operations. With



IN EVERY INSTANCE WHERE SEL-REX SILVER SOL-U-SALT WAS INTRODUCED IT WAS ADOPTED AS STANDARD.

SEL-REX SOL-U-SALTS are water soluble in pure crystaline form. Eliminates old-fashioned mixing, calculating or filtering. No objectionable dirt or dust.

SEL-REX BRIGHT GOLD SALTS produces "mirror-bright" deposits in *any* thickness *without* scratch brushing and/or buffing. Uses conventional equipment. Solution is stable and easily maintained.

Write Dept. P-9 for details on complete line of SEL-REX Gold, Silver, Nickel, Copper, Cadmium and Rhodium Salts and Solutions. Ample stocks for immediate delivery.

Sel-Rex® SEL-REX PRECIOUS METALS, INC.

229 Main Street • Belleville 9, N. J.

Available for Immediate Shipment, Attractive Values

THE FOLLOWING EXCELLENT REBUILT AND GUARANTEED ELECTROPLATING MOTOR GENERATOR SETS AND RECTIFIERS, WITH FULL CONTROL EQUIPMENT:

PLATERS

1—7500/3750 AMPERE, 6/12 VOLT, "OPTIMUS."
1—6000/3000 AMPERE, 6/12 VOLT, CHANDEYSSON.
1—6000/3000 AMPERE, 6/12 VOLT, ROGUE.
2—5000/2500 AMPERE, 9/18 VOLT, ELECTRIC PRODUCTS, 25° C.
1—5000/2500 AMPERE, 9/18 VOLT, CHANDEYSSON, 25° C.
1—5000/2500 AMPERE, 6/12 VOLT, EAGER.
1—3000/1500 AMPERE, 6/12 VOLT, HANSON-VAN WINKLE-MUNNING CO.
1—2500/1250 AMPERE, 6/12 VOLT, HANSON-VAN WINKLE-MUNNING CO.
1—2000/1000 AMPERE, 6/12 VOLT, "OPTIMUS."
1—1500/750 AMPERE, 6/12 VOLT, HANSON-VAN WINKLE-MUNNING CO.
1—1500/750 AMPERE, 6/12 VOLT, CHANDEYSSON.
1—1000/500 AMPERE, 6/12 VOLT, CHANDEYSSON.

ANODIZERS

2—1000 AMPERE, 30 VOLT, IDEAL, Exciter-in-head.
1—1000 AMPERE, 40 VOLT, CHANDEYSSON, 25° C.
1—800 AMPERE, 40 VOLT, M. G. C., Exciter-in-head.
1—400 AMPERE, 40 VOLT, M. G. C., Exciter-in-head.
1—500 AMPERE, 25 VOLT, CHANDEYSSON, 25° C.

RECTIFIERS

1—2000 AMPERE, 6 VOLT, G. E. COPPER OXIDE RECTIFIER.
1—GREEN SELECTROPLATER, 1600 AMPERE, 12 VOLT.
2—UDYLITE-MALLORY, 1440/720 AMPERE, 6/12 VOLT.

BUFFING LATHES

5 HP, 5 HP, 7½ HP and 10 HP, DIVINE, HAMMOND, M. G. C., GARDNER, TWIN 5 HP & TWIN 7½ HP ROME, and other popular makes.

SPECIAL

1—No. 101 PRODUCTION PIPE POLISHING MACHINE.
2—CROWN 12 x 12 and 18 x 18 CENTRIFUGAL DRYERS, steam heat.
5—24" and 30" ROBBINS & MYERS 2-SPEED VENTILATING FANS.
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1—CROWN 5-COMPARTMENT HORIZONTAL TUMBLING BARREL.
2—No. 1 and No. 2 RONCI LACQUERING MACHINES.

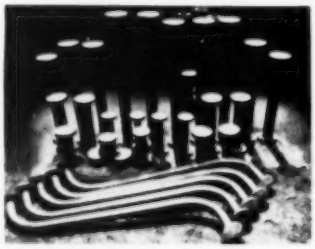
Above is partial list only. Write to us for all your requirements for Plating, Anodizing and Metal Finishing.

Any of the above machines may be rented. Write for details.

M. E. BAKER CO.
25 WHEFLER STREET
Kirkland 7-5460 CAMBRIDGE 38, MASS.

this new instrument, such operations can be performed faster and can be more accurately controlled than by any other method. Complete details on this new development can be obtained by writing for data file 72-267. Use Reader Service Card.

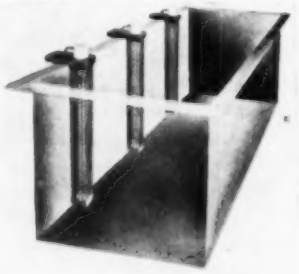
E—929. Rubber Lining Prevents Failures in Pipe Bends—New developments in lining and covering pipe, fittings and process equipment with rubber, originated by La Favorite Rubber Manufacturing



Company, 264 Wagaraw Rd., Paterson, N. J., now permit applications which have prolonged the useful life of pipe-line and process equipment.

Special designs of bent pipe and shapes now can be lined with rubber without risk of processing failure. A report on case histories is available through use of Reader Service Card.

E—930. New Electric Immersion Heater—First of its type to be tested and approved by leading electro-chemical suppliers—the new "Glorod" Electric Immersion Heater overcomes the many problems inherent to the heating of corrosive solutions, according to the Cleveland Process Company, 7016 Euclid Ave., Cleveland, Ohio.



The new fused quartz heater, totally inert to acids, requires no cleaning or maintenance, and also eliminates "stray" currents in electroplating.

Designed for heating all electropolishing and electroplating baths as well as phosphatizing solutions it is of rugged construction that provides complete protection against physical abuse. For your copy of the new Glorod Bulletin containing full information price list and technical details use Reader Service Card.

E—931. Metal Cleaning Solvent—Wayne Chemical Products Company, Detroit 17, Mich., announces Kemisol "A", a new and improved chemical solvent for cleaning parts better, quicker, and at a lower cost.

The new product is neutral, odorless, non-toxic, non-inflammable, and harmless to human skin. It is an excellent hand cleaner for the removal of oiliness, is non-corrosive to aluminum, brass, copper, and most other non-ferrous metals. For information and sample for test, use Reader Service Card.

E—932. Versatile Basket Has Distortion Resistant Frame—W. T. Lane & Bros., Inc., Poughkeepsie, N. Y., now offers—in 6 different sizes—a line of canvas baskets for materials handling applications in industry. The basket withstands severe punishment—because of a unique frame design which permits it to regain its shape after being distorted.

Construction features of the basket include double canvas bottom, leather-bound rim, reinforced canvas handles, tapered sides which permit space-saving nesting when empty, and smooth canvas sides which are snag-free, dust-tight and light-in-weight. For further information on these baskets, use Reader Service Card.

E—933. New Rohco Silver Brightener—A new silver brightener known as ROHCO Imperial Silver Brightener that is said to impart lustrous, satin finish that is smooth and soft—especially important in filigrees and other recesses—has been announced by R. O. Hull & Company, Inc., 1308 Parsons Court, Rocky River 16, Ohio.

According to the manufacturer, the brightener has exceptional qualities for both decorative and industrial plating. It improves covering power over lead alloys; gives better solderability; operates in any normal silver plating bath and is easy to control.

However, the brightener is not recom-

WILLIAMSVILLE *Buffs*

Tailored-To-Task Cutmaster Buffs
Run Cool - Won't Ravel
Cut Overhead Costs

Consult us now
about your needs!

WILLIAMSVILLE BUFF DIVISION
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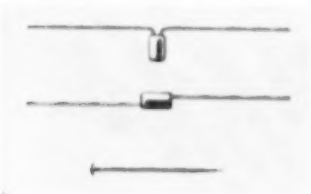
Equipment and Supplies

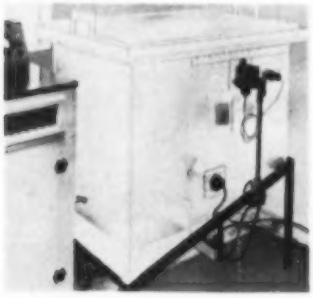
mended for exceptionally heavy silver deposits such as bearings. Details are available through use of Reader Service Card.

E–934. Sub-Miniature Selenium Diodes—A line of sub-miniature selenium diodes has been developed by Interna-



tional Rectifier Corporation, 1521 E. Grand Ave., El Segundo, Calif., for use in numerous electronic equipments where space is at a premium and the ambient temperature is high. They are designed for stable operation in an ambient temperature range of —60 to 100° C. These diodes are small and compact in size (1/6 inch diameter x 1-1/4 inch long), are provided with pigtail leads to facilitate wiring, are of potted plastic construction to protect against atmospheric corrosion. For additional data, use Reader Service Card.

E–935. Lucite Salt Spray Testing Cabinet—Seen as a major advance in electro-chemical equipment is the new Singleton H-T Lucite Salt Spray Testing Cabinet for "fog-type" spray testing of all ferrous and non-ferrous metals, organic and inorganic coatings, now being introduced by Singleton Company, 10516 Western Ave., Cleveland, Ohio.



Primarily designed for salt spray testing, the cabinet is said to be inert to all solutions and gases used in the complete range of "fog-type" testing, and will last indefinitely in continuous service.

E–936. Titeflex Filter Clarifies TV Plating Solutions—To insure the purity and clarity of its alkaline plating solutions, Stromberg-Carlson has installed a Titeflex Steel Well Screen Filter. Stromberg-Carlson reports this 1860 g.p.h. clarification filter efficiently removes zinc cyanide bath anode sludges with significant time and cost savings. The absence of replacement parts such as filter bags coupled with ease of operation have made it feasible to clean the unit by a backwash every day, thus making it possible to maintain a uniformly high clarity in the plating solutions. For further information use Reader Service Card.

E–937. New Hard Rubber Pump—The well-known patented Jabsco flexible neoprene impeller pump manufactured by the American Hard Rubber Company, 93 Worth St., New York 13, N. Y., is now available in hard rubber construction for handling acids, alkalies, and other corrosives at moderate cost.

The new pump handles viscous or thin liquids, is resistant to alkalies, solutions of metallic salts, inorganic acids, hydrochloric acid, is self priming, and will start instantly against suction lifts of 6 ft without a foot valve. When primed, it will handle suction lifts as high as 14 ft. For further information, use Reader Service Card.

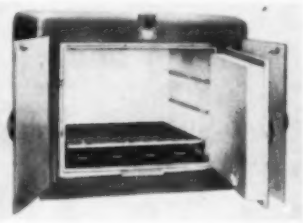
E–938. New Electropolishing Solution—Electro Process, Inc., 182 Ohio St., Buffalo, N. Y., announces electropolishing solutions with the use of Epco Brighteners characterized by safety, freedom from odor and toxic fumes, non-explosivity, non-inflammability and stability and permanency throughout continued use.

The new solutions are applicable to stainless steels of all series, high and low carbon steels, aluminum and magnesium, and are used commercially in the Electro Process, Inc., plant and in various outside customer installations. For further details use Reader Service Card.

E–939. Portable 1000° F Oven—A new portable electric oven for high temperature processing called Model HT-2 equipped with Inconel sheathed sealed tubular heating element for greater heating efficiency has been announced by Grieve-Hendry Company, Inc., Chicago 22, Ill.

Many applications such as baking, drying, preheating, stress relief of springs and plated parts have been found more adaptable to this type of oven.

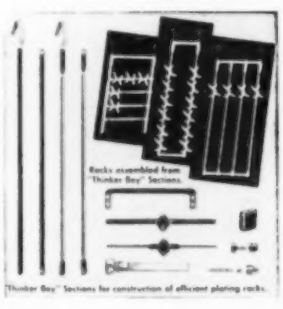
The new oven features a thermostat control with temperature range of 300° to



1000° F and a stainless steel interior, and is of a nesting type construction so that two or more of these ovens can be used in a group or bank. Individual ovens in a group may be cut out or ovens can be operated at different temperatures. Full details may be had by using Reader Service Card.

E–940. Standard Sections for Easy Manufacture of Efficient Plating Racks—Highly efficient and durable racks for any plating job are easily and quickly made with "Thinker Boy" sectional members, announced by Belke Manufacturing Company, 947 N. Cicero Ave., Chicago 51, Ill.

Most any style of rack can be made from assorted lengths of the various sections. The rack can be designed, assembled and in use in half the time required to make a sketch for a special rack.



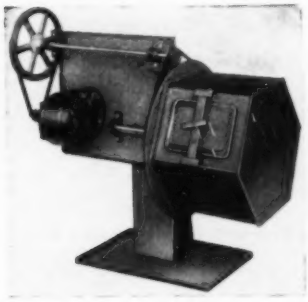
"Thinker Boy" Sections for construction of efficient plating racks.

Vac-Seal removable tips, available in hundreds of designs and all sizes, are quickly installed and easily changed for efficient racking of all kinds of articles. Descriptive literature is available through use of Reader Service Card.

E–941. Shelving for Ton Loads—Equipto, Division of Aurora Equipment

Company, Aurora, Ill., announces a new and super-strong line of shelves designed to hold up to 1 ton on each shelf. All shelving is instantly adjustable on 1½ inch centers, with no nuts, bolts or tools required for the job. Dividers, drawers, backs and side panels are available in all sizes. For further information, use Reader Service Card.

E—942. Barrel Finishing Machine—Rampe Manufacturing Company, 3320 St. Clair Ave., Cleveland 14, Ohio, have just added a new low priced barrel finishing machine to their line of inexpensive tumbler-mixers, model TMK, 200 pound capacity hexagonal steel burring barrel. This 33 R.P.M. machine is powered by a



1/4 h.p. 110 volt a-c single phase motor, has anti-friction bearings throughout, automatic slack takeup on the turntable belt, requires a 36 x 19 inch floor space, is 33 inches high, weighs 130 pounds. Barrels are furnished either unlined or lined with oil resistant vinyl plastic. For complete information use Reader Service Card.

E—943. Stainless Steel Reinforced Plastic Tubing—Tygon flexible plastic tubing with a triple wire, stainless steel outer braid has just been made available by the U. S. Stoneware Company of Akron, Ohio. This new form of tubing was developed to meet the demand for a chemically resistant, translucent, nontoxic, flexible tubing and hose for high pressure applications.

The new product absorbs vibration more readily and does not crack, leak, or break under working pressures up to and including 300 psi. Because of its flexibility, less footage is required than with rigid tubing, fewer fittings are necessary, and no special tools are needed for installation. It also has the added advantage of being translucent, permitting visual inspection of flow and simplifying cleaning.

E—944. New Weather-Proof Switch Introduced—A new compact, weather and oilproof push button electric switch is announced by Micro Switch of Freeport, Ill., a division of Minneapolis-Honeywell Regulator Company. Weighing only an ounce, the double-pole, double-throw assembly is so small it will fit inside a walnut shell. The panel-mounted push button is sealed against the entrance of oil, water and dirt by synthetic sponge rubber. The small movement required to operate sub-miniature snap-acting switches is provided by resilience of the seal. No sliding joints are required. For additional data, use Reader Service Card.

E—945. New Cation Exchanger—An analytical grade of a highly efficient cation exchange resin—Amberlite IR-112 (h)—offering outstanding properties of high porosity, regeneration efficiency, and stability in hydrogen cycle operation, is now available from the Rohm & Haas Company, of Philadelphia, Pa.

Its exceptional porosity which provides a rapid rate of reaction, suggests application in the recovery of complex ions and radioactive wastes; separation of rare earth metals and radioactive isotopes; recovery of scarce metals from plating baths; and chromatographic separations. For further information on the new resin, use Reader Service Card.

E—946. Centralized Combustion Safety Control—Centralization of the combustion safeguard equipment for 2 to 16 burners can now be accomplished with the new multiple burner system recently introduced by the Industrial Division of Minneapolis-Honeywell Regulator Co.

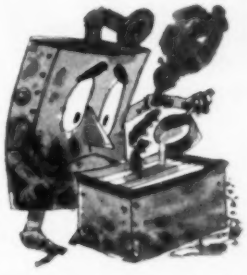
The new system features individual flame detecting relays for each burner housed in a single cabinet with push-buttons, signal lights and other component parts of the safeguard circuit. A photocell flame detector is used in the case of oil-fired burners while a flame electrode detector is found on gas or gas-

★ *at last . . .*

. . . a hard vinyl material with permanent toughness

• Unlike conventional "rigid" vinyls, outstanding physical properties are *integral* in chemical structure of LUCOFLEX . . . no plasticizers to "bleed out".

Introducing LUCO the happy corrosion resistant character . . . he's clean and flexible. You'll be seeing more of him.



for long life, low cost chemical resistant construction

In plating tanks, chemical hoods, ducts and valves—during long and continuous exposure to severe corrosives, you can *trust* LUCOFLEX . . . it will not harden, crack or "age".

and here is LOCO . . . he runs a sloppy shop. Look for his problems in future ads

LUCOFLEX, a new *unplasticized* polyvinyl chloride engineering material, achieves a new high in life/cost ratio for corrosion resistant construction. Because of its permanent properties, it can supplant more costly plastics which are often difficult to fabricate and mold. LUCOFLEX is supplied in sheets, rods, and tubes, and in a wide variety of shapes and sizes—it is machined, formed, welded and cemented with simple shop techniques. Investigate LUCOFLEX for *your* corrosion resistant problem.

Write for booklet on technical and fabrication data

AMERICAN LUCOFLEX, INC.

DEPT. B-9, 1 EAST 57th STREET, NEW YORK 22, N. Y.

Licensed Fabricator: **E. L. COURNAND & CO.**

3835 NINTH AVENUE, NEW YORK 34, N. Y.

Cowles AM

A non-etching type aluminum cleaner for use in soak tank cleaning. It was specifically designed to remove drawing, stamping, spinning compounds, rolling oils, marking inks, crayon marks and shop dirt from common aluminum alloys prior to spot welding, anodizing or other finishing operations.

for better aluminum cleaning and deoxidizing

Cowles DO

A powdered acid type deoxidizer designed for efficient removal of the oxide film from aluminum prior to spot welding, anodizing or chromate finishing. It inhibits rapid reoxidation. DO solutions dissolve primary film rapidly, then reoxidize the metal surface slowly and uniformly with an air-stable oxide film without leaving smut residues.

Write for Technical Data Sheets on Cowles AM and DO Cleaners Prompt Shipments from Convenient Warehouse Stock

Cowles Technical Service Gladly Furnished Upon Request

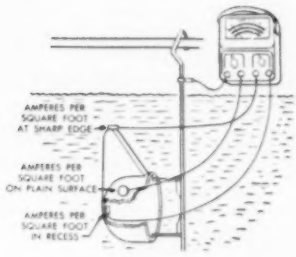
COWLES CHEMICAL COMPANY
METAL CLEANER DEPARTMENT
7016 Euclid Avenue • Cleveland 3, Ohio

FOR FURTHER INFORMATION, USE READER SERVICE CARD: INDICATE A 1133.

Equipment and Supplies

piloted oil fired installations. The flame detector and relay circuit acts to shut down the fuel supply in the event of flame failure at the burner. For additional data use Reader Service Card.

E—947. Current Density Meter—Accurate determination of plating deposit at all points on any article, before plating,



is made simple, quick and easy by a new type of current density meter announced by Belke Manufacturing Company, 947 N. Cicero Ave., Chicago 51, Ill.

Known as the Belke-Kotz Current Density Meter, the instrument has test leads for attaching to the surface of the article at selected places, such as on sharp points where burning may occur, on flat surfaces and in deep recesses. Through use of a dial switch on the meter, amperes per square foot can be read at each of three test points. Proper racking and proper location of the article in the tank can be determined efficiently along with the need for auxiliary anodes or burning bars, as well as their proper size and location. Optimum plating voltages are readily determined, throwing power variations of solutions are instantly indicated and much guesswork in plating is eliminated by use of the new meter.

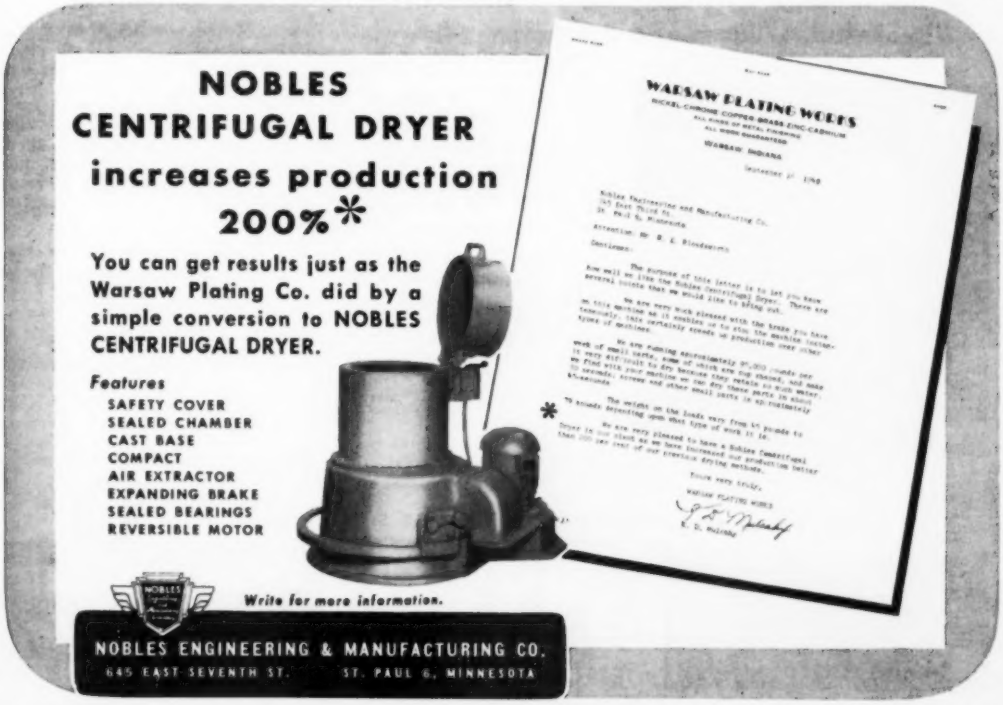
It is calibrated in amps/ft², has nine scales with ranges from 0–3 to 0–3000 amps/ft² to afford sharp reading in any range. Descriptive literature will be mailed promptly on request. Use Reader Service Card.

E—948. New Lighter Tramrail Section. A new tramrail section announced by the Forker Corporation, affords a 29 per cent weight savings over the old section obtained through web height reduction. The new B-2800 Teerail weighs 6.9 pounds per foot as compared against 9.6 pounds for the old section.

It is produced from hi-carbon, hi-manganese steel, is available in 20 ft lengths, 30°, 45°, 60° and 90° curves and permits handling up to 6,000 lbs. By maintaining the same tread width, the new tramrail section may be tied in with existing systems where plant expansions are planned, and also with heavier Beamrail installations. For detailed information use Reader Service Card.

E—949. Roto-Finish Compound Line Expanded—There are several new additions to the Roto-Finish line of compounds used in finishing a wide variety of metal parts with improved results, according to the Kalamazoo, Mich., firm.

In general, the compounds furnish lubrication, and maintain cleanliness of processing media and compartments. They also prevent tarnishing, etching or rusting of parts processed. Among the new and best known Roto-Finish Compounds are: No. 10-S for general use to produce a fine matte surface; No. 11 for deburring ferrous parts; No. 13 for rough deburring or cutting down operations; No. 14-M for grinding and severe cutting; No. 100 for deburring and polishing; No. 101 for deburring and finishing aluminum; No. 117 for scale removal; No. 117-A an alkaline neutralizer for use after No. 117; No. 202 for britehoning all types of metals; No. 255 for bright polishing operations and No. 300 and No. 355 coloring compounds. For complete information on these compounds use Reader Service Card.



PRODUCTION UP 150%
MAN-HOURS DOWN ONE-THIRD
WITH Stevens
BARREL-TYPE PLATING MACHINE AT DAISY MANUFACTURING COMPANY

Unplated BB shot is loaded into plating barrel by a chute.

After being plated the shot is dumped by the revolving barrel.

This tray receives the plated shot and funnels it into a conveyor.

Stevens Full Automatic Barrel-Type Plating Machine similar to the one in use at Daisy.

Plating air rifle BB ammunition is an unusual application for a huge plating machine, but the Stevens unit at Daisy Manufacturing Company, Plymouth, Michigan, is bringing new profits and efficiency to this operation. Formerly barrel plating was used to give the pellets their copper coating and it was an unwieldy and laborious process.

But with their Stevens machine Daisy has been able to install an ingenious conveyor system that requires no manual handling from the time the pellets are formed until they are ready for shipping. The pellets are transferred from the shaping machines to a chute and carried by conveyor to the Stevens machine. The machine does the rest.

After plating the shot, the Stevens unit empties it into another chute and a conveyor carries the pellets to automatic packaging machines. Daisy's plating department estimates that production is one and one-half times greater and man-hours are one-third less since installation of their materials handling system built around the Stevens Barrel-Type plating machine.

Stevens metal finishing equipment can bring the same benefits to your operation. If you have a plating problem, call in your nearby Stevens representative or write direct to Frederic B. Stevens, Inc., Detroit 16, Mich.

METAL FINISHING EQUIPMENT AND SUPPLIES SINCE 1883

FREDERIC B. **STEVENS** INCORPORATED

DETROIT 16, MICHIGAN

plating

SEPTEMBER, 1952 VOL. 39, No. 9

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This month's cover shows the Kedzie Chemical Laboratory at Michigan State College, where the work on Research Project No. 5 is being conducted.

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PLATING is abstracted regularly in Chemical Abstracts, Metallurgical Abstracts, Engineering Index, Technical Data Digest and Bulletin Analytique.

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Editorial

Everybody's Business

ALTHOUGH THE full impact of the recent steel production hiatus can not be evaluated adequately in terms of statistics alone, a pin-pointing summary emphasizes some of its overall effect. Like an ever-probing octopus, the tentacles of economic strangulation induced by the steel impasse reach into the quiet cottage of a retired elderly couple, the busy offices and factories, and into the darkest corner of the smallest plating shop.

Several millions of tons of steel have been lost almost as certainly as if they had been sunk in the sea. Through loss of the wages of 650,000 steel workers, plus countless other thousands in affected industries, there has occurred an inevitable loss of purchasing power. And, of course, the government will not collect the taxes on these lost payrolls, nor on the profits which would have been made.

On the plus side of the situation, the price increases to steel and the wage increases to steel's labor add up to one solid hard-smashing fact. Everything we buy is going to cost more. Metal finishing equipment and supplies, gasoline, heating fuels, and even the simple can of beans will react in an upward price spiral once the pieces of the jig-saw puzzle pattern that comprises our complex production picture fall into place.

Uncle Sam also suffers in that the cost of defense soars. The recently voted air arm funds, for example, being based on pre-strike estimates will be short about two billions of dollars. Higher taxes to foot this and other bills plunges the purchasing power of our dollar further downward so that it is now hovering about half of the January, 1939 counterpart.

Statistics, cold and unalterable, add up to an answer that pleases no one save those in the Kremlin whose sly smiles broaden over this turn of events in everybody's business.

Al Korbelak

RINSING . . .

H. L. PINKERTON

Graham, Crowley & Associates, Inc., Jenkintown, Pa.

THE RECENT UPSURGE in public attention to waste disposal and the necessity for conservation of critical materials has increased the interest in problems of rinsing, dragout and dragout recovery. As a result, in the design of plating plants for efficient use of rinse water, and in the study of recovery and waste treatment problems, much use has been made of the formulae developed by Kushner[1,2,3]. Other equations have been proposed[4,5], and there has also been criticism of all these expressions.

Several practical cases have come to the author's attention in which Kushner's work-equations 2 and 16 have been found to give impossible results, and this cast doubt on their accuracy in other ranges. There are two objections to these equations, which have been transformed into the present nomenclature system for clarity:

$$C_{max} = C_o + \delta \frac{V - Q}{VQ}$$ Kushner's Equation 2

$$C_{max} = C_o + \delta \frac{e^{-QM/V}}{V\,(1 - e^{-QM/V})}$$ Kushner's Equation 16

1. As the value of Q decreases toward zero, C_{max} approaches infinity instead of approaching C_o.

2. Even when Q is not very small, the factor δ/QM can often exceed unity, i.e., the concentration in the rinse tank exceeds that in the preceding plating tank, which is impossible.

Because of these considerations, the author derived two very cumbersome equations which express the maximum and minimum concentrations in a rinse tank during a rinsing cycle under equilibrium conditions. The minimum concentration occurs, of course, just before a rack is dipped; the maximum just after. The equations are complicated because consideration has been given to volume fluctuations caused by introduction and withdrawal of the rack and work, with their accompanying dragin (Fig. 1). The time interval between dipping and withdrawal of a rack and the time required for a tank to refill after the rack is withdrawn were also introduced as variables. The importance of these apparently minor variables can thus be evaluated and will be discussed later. The nomenclature used is as follows:

C_o = concentration of salt in dragin, oz/gal
C_{max} = highest concentration reached in the rinse tank under equilibrium conditions, oz/gal
C_{min} = lowest concentration under the same conditions, oz/gal
Q = flow rate of fresh water, gpm
δ = volume of solution dragged in on work and rack in each dipping operation, gal
V = volume of rinse tank, gal
W = volume displaced by work and rack, gal
M = interval between dipping operations, min
m_1 = interval between the instant of dipping a rack and the instant of its withdrawal, min
m_2 = interval between instant of withdrawal of a rack and
(a) the instant when the tank is filled again by fresh water Q, or
(b) the instant when the next rack is dipped, whichever occurs first
t = total working time since start of operations, min
n = total number of dipping operations = t/M
P = total weight of salt in rinse tank at any time, oz

It is necessary to assume that:

1. All mixing of dragin and of rinse water is instantaneous and perfect.

2. Immediately after a rack has been dipped and perfect mixing of dragin has occurred, there is an instantaneous overflow at the new concentration. (No rinse water is added, of course, during this zero time interval.)

3. Volume of dragin equals volume of dragout.

4. The dragin consists of a repetitive introduction at uniform intervals, which may be of any size, of equal volumes of solution of constant composition.

5. Rinse water flows constantly at a uniform rate. When the tank is not working, the rinse water is shut off. ($Q = 0$), and the time interval of idleness is not considered a part of the total time.

6. One rack is dipped and withdrawn before another enters. A group of racks entered at the same time is considered to be one rack.

The following equations can be derived by employing Kushner's series analysis of the problem, or by setting up a material balance at equilibrium, following the salt content and volume changes shown in Fig. 1:

$$C_{max} = \frac{\delta C_o}{V - W - Qm_2 - (V - W - \delta)e^{-Q(M-m_1-m_2)/V}} \quad (1a)$$

$$C_{min} = C_{max} e^{-Qm_2/(V-W}e^{-Q(M-m_1-m_2)/V}\left(\frac{V - W - \delta}{V - W - \delta + Qm_2}\right) \quad (2a)$$

Neglecting the refinements introduced by considering the volume fluctuations during the cycles, the following equations may be considered exact:

$$C_{max} = \frac{\delta C_o}{V(1 - e^{-QM/V}) + \delta} \quad (1)$$

$$C_{min} = \frac{\delta C_o e^{-QM/V}}{V(1 - e^{-QM/V}) + \delta} \quad (2)$$

Equation 2 is comparable to Kushner's equation 16, but includes an extra item (δ) in the denominator, because the present author has considered that the salt dragged in is dissolved in ($V + \delta$) gallons, whereas Kushner has used the approximate value V. If this approximation is used when $V(1 - e^{-QM/V})$ is of the order of magnitude of δ, i. e., when QM is of the order of magnitude of δ, and QM/V is less than 0.1, a serious error is introduced. Then $V(1 - e^{-QM/V})$ approaches QM, and we have an expression of the type

$$\frac{a}{b + a}$$ in which a in the denominator cannot be disregarded when b is less than, say, ten times a. When QM/V is 0.1 or less, the preceding equations 1, 1a, 2, and 2a may be simplified to:

$$C_{max} = \frac{\delta C_o}{QM + \delta} \quad (3)$$

It can also be shown that the value of equation 3 *always* lies between the values of equations 1a and 2a (or 1 and 2). Because these latter are exact equations, the suspicion arose that equation 3 was more fundamentally true than might seem from the approximation used in its derivation. Equilibrium conditions can be expressed very exactly and without any simplifying approximations whatever, by use of a material balance. The same assumptions will be made as before, except that assumption 2 is not necessary.

At equilibrium, the volume and total salt content in the tank do not change between one rinsing cycle and the next. Therefore, in any one cycle:

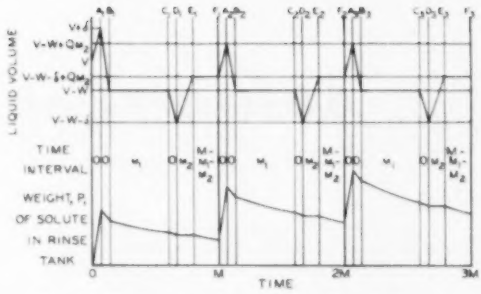

Fig. 1. Changes in volume, total salt content, and salt concentration, in successive rinsing cycles

Volume introduced = volume withdrawn

Weight of salt introduced = weight of salt withdrawn.

Then if C_o is the average equilibrium concentration during the cycle: $\delta C_o = (QM + \delta) C_o$, which is equation 3 with a modified definition of the limiting equilibrium concentration.

It is to be noted that the tank volume does not appear in this equation, which fact has caused some controversy[4]. The reason for the disagreement about the effect of tank volume is clear from Fig. 2. Equation 3 gives the same result for all values of V; equation 1 (or 1a) gives diminishing values as V increases, while the opposite is true of equation 2 (or 2a) and Kushner's equations 2 and 16. This is merely another way of stating that when the tank volume is small, the fluctuation in concentration during a rinsing cycle is relatively large, but in a tank of large volume, the fluctuation is small. In any case, equation 3 may be used confidently under all conditions, since it always and exactly gives a mean value lying between the upper and lower limits of fluctuation.

The effect of V, as well as the effect of the minor variables considered in deriving equations 1a and 2a is noticeable only when one attempts to calculate the concentration attained after a finite number of dipping operations, before equilibrium is reached. This calculation is quite sensitive to changes in V and δ, but the effect of variations in W, m_1, and m_2, is insignificant and may be neglected. This being so, the following equation may be used to obtain the concentration C_t after t minutes during which n dipping operations have been performed:

(*Continued on page 1031*)

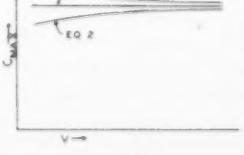

Fig. 2. Illustrating the Effect of Rinse Tank Volume on C_{max} as calculated by various equations

Abstracts of Convention Papers

Some Engineering and Economic Aspects of the Disposal of Cyanide Plating Wastes by Dr. Barnett F. Dodge.

The objective of A. E. S. Research Project No. 10 is to make available information which will be helpful to platers in meeting the problem of treating their wastes. This information is very diversified and must be obtained from a variety of sources—from the literature, visits to treatment plants, conversations with men experienced in the field, equipment manufacturers and from laboratory experiments on the glassware scale and finally pilot plant experiments.

Thirteen processes have been considered and seven were dismissed from consideration for the following reasons:

(1) Too costly. (2) Treatment is incomplete. (3) Technically infeasible. (4) Subsequent release of toxic substances.

The numbers in parenthesis at the end of each line below indicates the reason why that specific process was not thoroughly studied and the listing gives the possible processes in their order of increasing importance:

1. Evaporation to dryness (1)
2. Reaction of cyanide with aldehydes to form a less toxic compound (1, 2, 4)
3. Oxidation of cyanide by agents such as peroxides and permanganates (1)
4. Removal of cyanide as insoluble metal cyanides (1, 2)
5. Conversion of cyanide to thiocyanate (2, 4)
6. Dilution (3)
7. Lagooning and gradual loss of HCN (3)
8. Removal of cyanide by formation of complex ions
9. Oxidation of cyanide by electrolytic means
10. Oxidation of cyanide by ozone
11. Ion exchange
12. Volatilization of HCN by addition of acid
13. Oxidation of cyanide by available chlorine

Process No. 8 was ruled out on the basis of uncertainty of producing a satisfactory effluent and Process No. 9 was satisfactory for heavy cyanide concentrations, but not for rinses, etc. Process No. 10 had attractive features, but the price of ozone was higher than chlorine and the toxicity greater. Process No. 11 was considered to be too new as yet and Process No. 12 and No. 13 have been widely used, Process No. 13 being most popular.

Certain cost considerations were presented (gaseous chlorine is cheaper than hypochlorites), and a series of economic studies were proposed to clarify the picture, studies which are necessary to permit definite recommendations.

Benefits to the Plater of the American Electroplaters' Society Research Program, by Dr. Earl J. Serfass, Lehigh University, Bethlehem, Pa.

Scientific research in general was well defined by Mr. Kettering when he said: "Research is a process of finding out what we're going to do after we can't keep on doing what we're doing now". When research is carried out for the purpose of increasing our national laws it is called fundamental research; if it is the search for facts or principles related to a specific application it is called applied or industrial research. Still another type of scientific work includes control, development and testing. The dividing line is not sharp and the true scientific worker is shirking his duty to society if he has no goal or fails to interpret and publicize his work. Industry must support scientific research *with a goal* and it must be prepared to examine the results of this research and put them to work. For the past two years the A. E. S. Research Committees have been constantly aware of this two-fold objective. The fourteen projects sponsored by the A. E. S. over the past seven years have provided many tangible results (listed) and a number of intangibles in the continuing value of the literature searches, bibliographies and critical reviews. The project associates receive valuable training in the field of plating and many become valuable adjuncts to the technical personnel in the plating industry. The stimulus to project committee members resulting from association with a project is reflected in their daily work and, finally, the stimulus the A. E. S. Research Projects have given to other scientific research workers is another intangible which can be of value to platers as time passes.

In order to discover *anything*, one must be *looking* for *something*. The A. E. S. Research Committees have been aware of this. Every plater, technical research worker and plating engineer should be alert to possible uses of these programs in his plant. Only in this way can the plating industry prosper.

Hard Coatings for Aluminum, by F. Keller, Alcoa Research Laboratories, New Kensington, Pa.

Unusual wear resistance can be imparted to the sur-

(*Continued on page 1024*)

RADIOACTIVE ISOTOPE DILUTION METHOD FOR DETERMINING SULFATE CONCENTRATION IN CHROMIUM PLATING BATHS

By

STANLEY L. EISLER

Abstract

A procedure employing the isotope dilution technique is described. The method has been found to give results which are accurate to within 1 to 3 per cent of the true values of sulfate concentration. The reproducibility of the method was found to be very good as evidenced by a 2 per cent average deviation from the mean in a series of seven samples run on two different occasions. As had been expected comparative tests by the gravimetric procedure consistently gave higher results than the radiometric method owing to the errors caused by co-precipitation.

Introduction

The accuracy of the sulfate ion determination in chromium plating solutions is very important because of the low concentration of sulfate ion in the bath and the necessity for maintaining as near as possible an optimum ratio of chromium trioxide to sulfate ion.

As pointed out in another article[1] the presently used gravimetric method of analysis by which the sulfate ion is precipitated as barium sulfate has proven unreliable because of co-precipitation of other anions and cations and the possibility of dirt or other impurities being collected in the precipitate. According to Karaoglanov[2] the amounts of ions contaminating the precipitate are related to the solubility of the corresponding sulfate and the solubility of the corresponding barium salt in the case of anions. He claims that this cannot be explained on the basis of adsorption, but on the assumption that with the formation of barium sulfate, a secondary chemical precipitation process takes place in which the cations and anions in question participate. In another article[3] Karaoglanov states that many procedures give good results only because of compensation of errors and he theorizes that such products as $(BaCl)_2SO_4$ are formed and affect the determination proportionately to their insolubility.

This investigation was inaugurated to eliminate the shortcomings noted above and, if possible, to reduce the time required for the analysis.

The Isotope Dilution Method

The basic principle of the isotope dilution procedure, as given by Friedlander and Kennedy[4] involves the addition to the unknown mixture of a known weight of the compound to be determined, the tracer containing a known amount (activity) of radio-actively tagged molecules. After the pure compound has been

*The opinions or assertions contained herein are not to be construed as official or reflecting the views of the Department of the Army.

†Radiochemist, Ordnance Corps, Rock Island Arsenal, Rock Island, Ill.

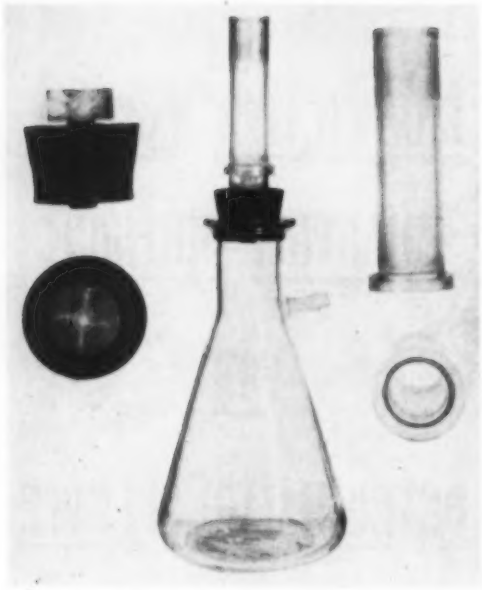

Fig. 1. Filtration apparatus

isolated from the mixture its specific activity (activity per unit weight) is determined and compared with that of the added compound; the extent of the dilution of the tracer shows the amount of inactive compound present in the original unknown. The formula for calculating the weight of the unknown from the specific activities is presented later.

A very important advantage of the isotope dilution method, according to Schweitzer and Whitney[3], is that a quantitative isolation of the final compound is not at all necessary. For this reason, it was thought possible to use in place of the conventional barium chloride a precipitating agent which produces a less insoluble product. If this were possible, many of the shortcomings of the barium sulfate precipitation method would be eliminated.

Preliminary Experiments

The radiosulfur used in this investigation was purchased from the Oak Ridge National Laboratory by authorization of the Atomic Energy Commission, Isotopes Division. It was received in the form of dilute $H_2S^{35}O_4$ and added to a standardized H_2SO_4 solution to give an activity level of approximately 0.05 microcurie per milliliter.

A number of tests were conducted using benzidine dihydrochloride as the precipitating agent in place of barium chloride. Tests on dilute sulfuric acid alone proved very successful. However, when precipitation of the benzidine sulfate from a reduced chromic acid solution (approximately of plating solution concentration) was attempted, it proved unsuccessful. This result was attributed to the very high acidity of the solution, caused by the acids used in the reduction of the hexavalent chromium.

The use of benzidine dihydrochloride having proved unsuccessful, several other precipitating agents, such as strontium chloride, lead nitrate, and antimony chloride were tried. They also failed because the solubility products of the sulfates were higher than the concentrations found in the plating solutions.

The next step, therefore, was to develop a method using barium chloride which would eliminate the effects of co-precipitation that cause the inaccuracies in the gravimetric procedure. The new method is based on the assumption that precipitates of controls and samples alike would contain the same amount of impurities when prepared from similar solutions. The amount of impurities cannot be considered negligible but, at least should be comparable and for that reason their effect on the true result should be minimized.

Preparation of Precipitate

During the preliminary tests using benzidine dihydrochloride and sulfuric acid solutions, the benzidine sulfate precipitate was prepared by adding the precipitant to the acid, centrifuging, decanting, recentrifuging, decanting and then transferring the precipitate to a stainless steel cup. The precipitate was then dried and counted. It was believed that when this method was applied to the tank solutions, using an aliquot portion, the method would be much shorter than the lengthy filtration procedure. Transfer of the precipitate to the cups is not a critical step since a quantitative separation is not necessary when utilizing the isotope dilution method. However, counting results obtained by this method indicated that the non-uniform thickness of the precipitate over the entire cup area produced errors.

To produce a precipitate of uniform thickness over the entire counting area, it was decided to use a filtration apparatus as shown in Fig. 1.

This apparatus utilizes a plastic funnel with a .871 inch diameter top surface. The top surface has a slight spiral groove and cross lines cut into the surface to facilitate flow of the liquid to the four holes spaced at 90° intervals near the outer rim of the funnel. These four holes are connected by diagonal holes through the thickness of the funnel to a center larger hole which drains into the suction flask. The holes in the top surface were spaced so as to avoid build up of a precipitate at the center as was encountered when only one central hole was employed. The filter paper disc is mounted on the top surface of the funnel and then a tight fitting plastic cylinder with an inside diameter of .702 inch is pressed over the disc. This results in a uniform precipitate with a diameter of .702 inch and an area of 2.5 cm². Use of this apparatus also produces a preformed filter paper disc which may be easily mounted on an aluminum disc and then held in place by an aluminum ring which slips over the disc and paper.

Self-Adsorption Considerations

According to Aten[6] there are three factors which can influence the efficiency of the counting measurement of a sample, namely, back-scattering, size, and self-adsorption. In the work done, the first two are made essentially constant by standardization of the material of the disc and the size of the precipitate, respectively. However, the problem of self adsorption was more difficult as the precipitate weights and correspondingly the weights per unit area (or sample thickness as generally defined in radiochemistry) varied considerably from sample to sample, due to the varying amounts of sulfate in the unknown. Schweitzer and Stein[7] state that the true activity is diminished by an amount dependent on sample thickness. However, they also state that this effect may be overcome by the use of infinitely thick samples where the measured activity is proportional to the specific activity.

Since the specific activity is the value required for calculation of the extent of dilution in the isotope dilution method, it was decided to increase the sample size so that in all cases a sample of infinite thickness would be obtained. By doing this it was found that all weighings could be eliminated. This was possible as a value proportional to specific activity is obtained directly, while normally it is necessary to divide the true activity by the weight to get the true specific activity which is then used in the isotope dilution formula to determine the weight of the unknown.

The amount of sample required was based on work previously done, which indicated that there was no increase in counting rate above a sample thickness of approximately 25 mg/cm² in the case of $BaSO_4$ precipitates. This is shown graphically in Fig. 2.

Final Approved Test Procedure

The final approved procedure for sulfate analysis in chromium plating tank solutions is as follows:

1. Pipette a 15 ml sample into a 250 ml beaker.

2. Add 1.5 ml of approximately N/10 H_2SO_4 containing about .05 microcurie of $H_2S^{35}O_4$ per ml.

3. Add 50 ml of water, 10 ml concentrated hydrochloric acid, 15 ml glacial acetic acid and 20 ml ethyl alcohol.

4. Boil for 15 minutes.

5. Add 15 ml of 10 per cent $BaCl_2$ solution. Boil one minute and then allow to stand at least one hour.

6. Filter each sample, using a 1-1/8 inch disc of S & S No. 597 filter paper mounted on the filtration apparatus shown in Fig. 1.

7. Mount the filter paper disc on an aluminum disc and ring assembly, dry under an infra-red lamp, and count.

All counting was done by placing the sample on the first shelf of a lucite mount located in a lead shield with 1½ inches of lead shielding, so that the sample was 10 mm from the window of the counter tube. The counter tubes were Tracerlab Model TGC-2 tubes with

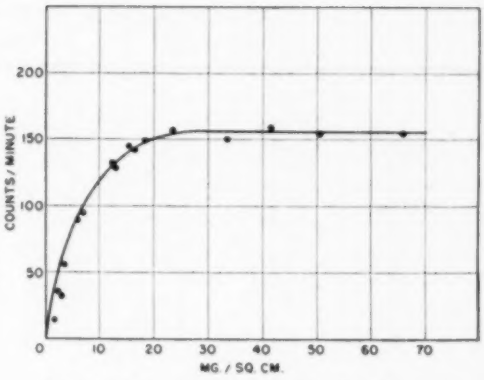

Fig. 2. Sample thickness of $BaSO_4$ versus counting rate

mica window thicknesses of 1.8 and 1.9 mg/cm², respectively.

The control samples are prepared by placing 15 ml of a 25 per cent CrO_3 solution in a 250 ml beaker and adding 7.5 ml of the N/10 H_2SO_4 solution containing the radioactive sulfuric acid. Then the procedure previously given is followed from steps 3 to 7 inclusive.

The formula for calculating the weight of unknown by use of the isotope dilution method is as follows:

$$W = \left(\frac{S_a}{S_b} - 1\right) W_a$$

where W = Weight of unknown
W_a = Weight of known added
S_a = Specific activity of control
S_b = Specific activity of mixture

As previously stated, the specific activity is proportional to the counting rate of infinitely thick samples, so the counting rates may be substituted directly in the above equation for the values S_a and S_b.

Expanding this formula to cover the conditions of the proposed test procedure and to have the result in oz gal of $SO^{-}{}_4$, as usually expressed in plating circles, the following steps are involved:

Normality of acid used for control x 49 = mg of H_2SO_4/ml.

Let

$$\left(\frac{S_a}{S_b} - 1\right) = \text{Ratio}$$

Ratio x mg of H_2SO_4/ml x 1.5 = mg of H_2SO_4 in unknown sample.

Mg of H_2SO_4 in unknown sample ÷ 15 = mg H_2SO_4/ml of unknown sample.

Mg H_2SO_4/ml x 0.1335 = oz H_2SO_4/gal.

oz H_2SO_4/gal x .98 = oz $SO^{-}{}_4$/gal.

$$\frac{\text{Ratio x mg } H_2SO_4\text{/ml in control x 1.5 x 0.1335 x .98}}{15}$$

TABLE I. ACCURACY OF ISOTOPE DILUTION METHOD
Test L-17

Sample No.	Ml H_2SO_4 Containing S^{35}	Ml H_2SO_4	Average Time Sec	Count/min Corrected	Ratio	True Ratio	Per Cent Error
Control	7.5	0	.....	6792	.....	.....	...
2	1.5	6.0	276.19	1341	4.065	4.000	1.6
3	1.5	6.5	293.87	1258	4.399	4.333	1.5
4	1.5	7.0	311.81	1181	4.750	4.667	1.8
5	1.5	7.5	325.87	1127	5.027	5.000	0.5
6	1.5	8.0	341.44	1073	5.330	5.333	0.05
7	1.5	8.5	353.69	1034	5.569	5.667	1.7
8	1.5	9.0	377.94	965	6.038	6.000	0.6
						Average per cent error	1.1

= oz $SO^{=}_4$/gal or Ratio x mg H_2SO_4/ml in control x 0.013083 = oz $SO^{=}_4$/gal

Test Results

Two series of tests were planned to check the accuracy and reproducibility of the new method. The first series of tests involved the use of known samples by which it was hoped to prove the accuracy of the method. The second series of tests was conducted using actual tank samples to prove the reproducibility of the method.

For the first series of tests two H_2SO_4 solutions of like normality were prepared. To one of these solutions sufficient $H_2SO^{35}O_4$ was added to produce an activity level of .05 microcurie per milliliter. Samples were prepared containing varying amounts of the two solutions. To these solutions there was added 15 ml of the 25 per cent CrO_3 solution to simulate the actual conditions of tank samples. The final approved procedure was then followed for preparation of counting samples and counting rates were determined. Based on these counting rates, the dilution ratios were calculated and compared with the true ratios based on the quantities of H_2SO_4 and radioactive H_2SO_4 used. Control samples were counted for one minute and all others to a total of 6400 counts. All counting rates were corrected for background and coincidence loss. The results of two identical tests are presented in Tables I and II.

It will be noted the average per cent errors of the two tests were 1.1 and 3.3 respectively, giving an overall average of 2.2 per cent. This degree of error is considered above average for work involving radioactivity which is influenced by the randomness of atomic disintegration and counter efficiency among other factors. It is believed that this margin of error is a big improvement over that of the gravimetric procedure which may show reproducibility but the accuracy of which is questionable.

The second series of tests consisted of running actual tank samples from the chromium plating department at this Arsenal. Samples from seven differ-

TABLE II. ACCURACY OF ISOTOPE DILUTION METHOD
Test L-17a

Sample No.	Ml H_2SO_4 Containing S^{35}	Ml H_2SO_4	Average Time Sec	Count/min Corrected	Ratio	True Ratio	Per Cent Error
Control	7.5	0	.....	6644	.....	.....	...
2	1.5	6.0	287.42	1288	4.166	4.000	4.1
3	1.5	6.5	308.43	1196	4.564	4.333	5.3
4	1.5	7.0	324.05	1136	4.858	4.667	4.0
5	1.5	7.5	340.12	1079	5.167	5.000	3.3
6	1.5	8.0	355.55	1030	5.461	5.333	2.4
7	1.5	8.5	358.54	1021	5.518	5.667	2.6
8	1.5	9.0	387.88	939	6.087	6.000	1.4
						Average per cent error	3.3

TABLE III. REPRODUCIBILITY OF ISOTOPE DILUTION METHOD

Tank No.	Test L-18 Average Time Sec	Test L-18 Count/min Corrected	Test L-18 Ratio	Test L-18 Oz $SO^{=}_4$ per gal	Test L-18a Average Time Sec	Test L-18a Count/min Corrected	Test L-18a Ratio	Test L-18a Oz $SO^{=}_4$ per gal
4	272.5	1362	4.784	0.311	305.1	1212	5.358	0.348
6	276.7	1343	4.866	0.316	289.2	1283	5.006	0.325
7	274.1	1352	4.827	0.314	285.8	1298	4.937	0.321
9	255.2	1457	4.407	0.286	260.4	1430	4.389	0.285
15	257.4	1445	4.452	0.289	264.9	1406	4.481	0.291
L	219.7	1704	3.623	0.236	225.2	1664	3.631	0.236
S	244.3	1526	4.162	0.270	232.3	1611	3.783	0.246
Control		7878				7706		

ent tanks were analyzed. The final approved test procedure was followed in its entirety. Duplicate samples were run on each of two days and are designated Tests L-18 and L-18a. Each sample was counted twice on each of two scalers. The average values of the eight counting determinations run on each day are presented in Table III.

The sulfuric acid containing radioactivity used for these tests was .1014 N. This gave a constant value for K = 0.065004 where K = mg H_2SO_4/ml in control x 0.013083.

Referring to Table III, it will be noted that there was exceptionally good agreement between the two tests in all cases except tanks 4 and S. This degree of reproducibility combined with the degree of accuracy shown in the first series of tests indicates the reliability of this method.

Table IV presents the comparative data between the isotope dilution method and the gravimetric method. The per cent deviation from the mean of the two tests run by the isotope dilution method are also presented in column 3. It will be noted that the average deviation is only 1.9 per cent, which is considered to be very good for the determination of sulfate ion concentration. The difference between values obtained by the two methods expressed as percentages of the values determined gravimetrically are presented in column 5. It will be noted that the gravimetric value was consistently higher and the differences ranged from 4 to 12 per cent with the majority between 10 and 12 per cent.

Calculations have also been made to show that when counting rates taken on only one scaler are used, that the final results will be comparable to those calculated from the counting rates taken on two scalers. This will facilitate the counting procedure so that automatic counting equipment may be used to advantage.

Summary

Since the accuracy of the gravimetric method has long been questioned and the indicated better accuracy for the isotope dilution method is detailed above, there is a distinct advantage to be gained by the use of the latter method. Therefore, considering the pre-

(*Continued on page 1031*)

TABLE IV. COMPARISON OF ISOTOPE DILUTION AND GRAVIMETRIC METHODS

Tank No.	Oz/gal $SO^{=}_4$ Isotope Dilution Average	Per cent Dev. from Mean	Oz/gal $SO^{=}_4$ Gravimetric	Difference Expressed as a per cent of the Grav. Result
4	0.330	5.6	0.345	4.3
6	0.320	1.4	0.355	9.8
7	0.318	1.1	0.347	8.4
9	0.286	0.2	0.324	11.7
15	0.290	0.3	0.326	11.0
L	0.236	0.0	0.265	10.9
S	0.258	4.7	.....	.....

Average per cent deviation = 1.9

ABSTRACTS

(Continued from page 1018)

faces of many aluminum articles by applying either an Alumilite Hard Coating or a Martin Hard Coating. These oxide coatings are thicker, denser and much more resistant to abrasion than the coatings ordinarily employed for decoration or protection. They make it possible to substitute aluminum alloys for steel or bronze for many parts where the combination of light weight and high resistance to wear is important.

Hard oxide coatings can be formed on aluminum by electrolytic treatment with special modifications of standard Alumilite processes. The electrolyte consists primarily of dilute sulfuric acid modified either to reduce dissolution of the coating during formation, or permit operation under the specific conditions required for the formation of the thicker, more abrasion resistant coating.

The basic factors which control the growth and density of the oxide coating are discussed. To form a thick coating of the more abrasion resistant type it is necessary to select the most suitable alloy for coating, employ a special electrolyte, lower the temperature to reduce solvent action and to form the coating as rapidly as possible by employing much higher than normal current densities.

The resistance to abrasion of Alumilite Hard Coating and Martin Hard Coating is compared with that of ordinary Alumilite coatings by two different abrasion tests. One of these tests establishes the comparative resistance to wear by rubbing action; the other the resistance to erosion from a grit blast. By these tests it is shown that the new hard oxide coatings are much more resistant to wear than ordinary oxide coatings. Improvement in resistance to the rubbing type of abrasion is greater than that for the blast type. After 50,000 cycles on a Taber Abraser a MHC coating, 2 mils in thickness, showed only half as much wear as a case-hardened steel surface. By the grit blast abrasion test the resistance to abrasion is about double that for ordinary Alumilite coatings of the same thickness.

Charts are shown illustrating the difference in thickness and density of the coatings obtained with the Alumilite Hard Coating and the regular Alumilite treatment for various commercial aluminum alloys.

The Plating of Aluminum Articles as a Production Process

A. W. WALLBANK

Correction

The following correction should be made on the article published in the July, 1952 issue: The footnote on page 757 should read . . . "To do so, divide the number of ounces per gallon in each case by 1.2 . . ." We regret this error.

Book Review

DR. HAROLD J. READ
Professor of Metallurgy, Pennsylvania State College

ANALYSIS OF ELECTROPLATING AND RELATED SOLUTIONS by K. E. Langford, 1951, xi + 369 pages. Electroplating and Metal Finishing, 83/85 Udney Park Road, Teddington, Middlesex, England. Price, 52 shillings, (U. S. A., $8.60).

Although many collections of analytical methods for metal finishing solutions have appeared as parts of handbooks or texts, Langford's book is possibly the first extensive volume devoted entirely to this subject. The book is organized on the basis of types of solutions to be analyzed, and the directions are specific for each solution. Even though the book is essentially a compendium of directions, the author has incorporated sufficient theory and explanatory comment to enable the user to avoid difficulties which may arise in special circumstances. In particular, he has given careful attention to the limitations of each method.

Where possible, gravimetric, volumetric and electrolytic techniques are described for each solution, and appropriate indications are given as to which methods are most suitable for the plater and which are best for the chemist. Selections for the plater are made on the basis of simplicity of technique. Coverage with respect to variety of metal finishing solutions is extensive and includes cleaners, pickles, anodizing solutions, dips, phosphating solutions, etc., as well as plating solutions. The analysis of deposits and anodes is not covered. Within this framework the methods presented are well chosen, logically organized and clearly presented. The American reader should be warned, however, that factors for oz/gal are based on the Imperial gallon and must be converted for American gallons.

From the viewpoint of the modern analyst, the neglect of physical methods of analysis is the only real weakness of the book. Although a chapter is devoted to this subject, the techniques are discussed but briefly, and no specific directions are given for their use. Even here emphasis seems misplaced, for more attention is given to conductimetric analyses than to colorimetric methods. The single method given for surface tension measurement is cumbersome compared to the stalagmometer, which is not even mentioned.

The importance of *p*H control in many metal finishing solutions would appear to dictate the inclusion of methods for *p*H determination. It is difficult to understand why they have been omitted, and the inclusion of a suitable general chapter with appropriate cross-references in the chapters on specific solutions would not have increased greatly the size of the book.

Within these limitations the book is a welcome addition to the metal finishing literature. It is well indexed, there are adequate tables of miscellaneous information, and it is remarkably free of typographical errors.

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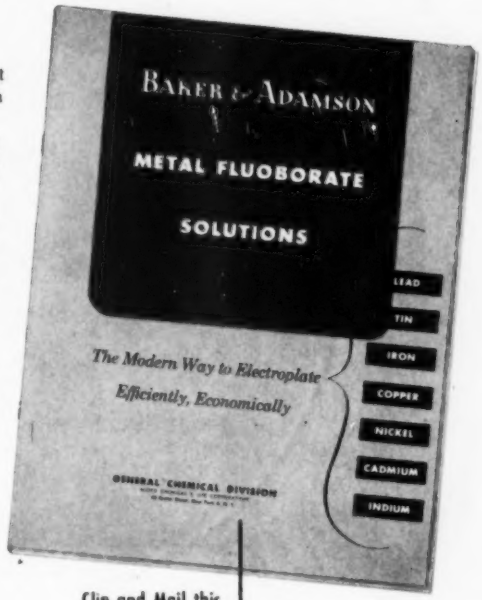

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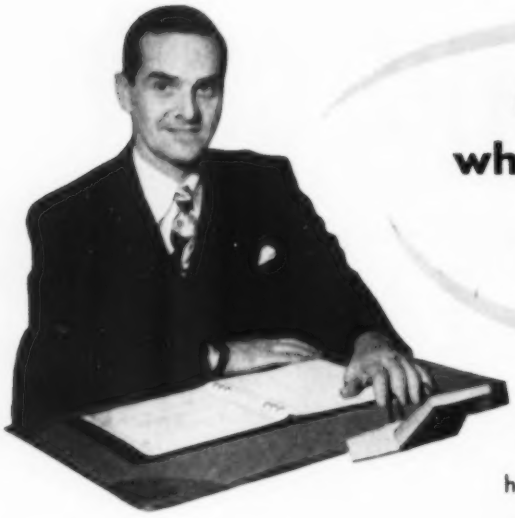

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HARD CHROMIUM PLATE TO IMPROVE THE CORROSION RESISTANCE OF TOOL STEEL

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Westinghouse Electric Corporation, East Pittsburgh, Pa.

ABSTRACT

The corrosion protection offered by hard chromium plating was found to be proportional to the thickness of the chromium plate and to the surface smoothness of the panel before plating. For molds, it is recommended that the surface be given a finish of 5 microinches or less prior to plating and that the chromium plate thickness be at least 0.0005 inch thick.

INTRODUCTION

For some time, controversy has existed as to the value of hard chromium plate in improving the corrosion resistance of tool steels. Hard chromium plated molds are generally accepted by the plastic molding trade as being superior to unplated molds. The hard chromium plate is generally described as very hard wearing and corrosion-resistant.

One of the commonly accepted reasons for hard chromium plating plastic molds is to minimize wear and thus increase the mold life inasmuch as hard chromium plate has extreme hardness and a low coefficient of friction. In addition, the chromium plate aids in maintaining the desired surface finish on molded parts. Hard chromium plating also serves as a valuable "buildup" tool for salvaging undersized-mold parts due to unpredicted growth during heat treatments, mistakes in machining, or normal wear. A major cost reduction consideration in high volume, short cycle molding operations is the excellent anti friction property of chromium plate which practically eliminates down time caused by sticking induced by resin build-up.

The object of the work reported here was to show how chromium plate affects the corrosion resistance of tool steel.

EXPERIMENTAL

Panels of tool steel were heat treated to a hardness of R_c 52–55 and were given three different finishes: (1) medium sandblast, 150 microinches, RMS average; (2) original machined finish 25 microinches, RMS average; (3) ground and buffed finished 2 microinches, RMS average.

The panels with the different surface finishes were then divided into four groups; one group was left bare and the other three groups were plated with different thicknesses of chromium, namely: flash, 0.0005 inch and 0.001 inch. The following plating cycle was used:

1. Vapor degrease
2. Immersion soak in hot alkaline cleaner 30 seconds
3. Rinse thoroughly in cold water
4. Reverse etch 30 seconds at 6 volts in plating solution and plate at 2 amp/sq in (Temperature 131 ° F)*

*The plating solution analyzed as follows: 27.4 oz/gal trivalent chromium and 0.01 oz/gal iron.

TABLE I. TOOL STEEL PANELS AFTER IMMERSION IN CARBONATED DISTILLED WATER

Finish on Panel	Per cent of Total Area Rusted		
	Sand Blasted Before Plating (Approx. micro finish 150 RMS)	As Machined Before Plating (Approx. micro finish 25 RMS)	Buffed Before Plating (Approx. micro finish 2RMS)
Bare—24 hr immersion	50	20	5
"Flash" chromium plated approx. 0.00005 inch—288 hr immersion	40	10	0
Chromium plated 0.0005 inch—288 hr immersion	2	0	0
Chromium plated 0.001 inch—288 hr immersion	0	0	0
Chromium plated 0.001 inch—361 hr immersion	2	2	0

TABLE II. TOOL STEEL PANELS AFTER EXPOSURE TO 95 PER CENT RELATIVE HUMIDITY

Finish on Panel	Per cent of Total Area Rusted		
	Sand Blasted Before Plating (Approx. micro finish 150 RMS)	As Machined Before Plating (Approx. micro finish 25 RMS)	Buffed Before Plating (Approx. micro finish 2 RMS)
Bare—21 hr exposure	95	35	20
"Flash" chromium plated approx. 0.00005 inch—64 hr exposure	8	4	2
Chromium plated 0.0005 inch—161 hr exposure	5	2	1
Chromium plated 0.001 inch—720 hr exposure	2	1	0

5. Rinse thoroughly and air dry

They were then immersed in 250 ml pyrex beakers of distilled water through which carbon dioxide was bubbled at the rate of 15 ml per minute. Table I and Fig. 1 show the appearance of the panels after being immersed for different periods of time in the carbonated water.

Another set of panels was exposed to 95 per cent relative humidity. Table II and Fig. 2 show the appearance of the panels after exposure to 95 per cent relative humidity.

Discussion

Figs. 1 and 2 show that chromium plating definitely protects tool steel from carbonated water and from 95 per cent relative humidity.

The data were made from visual observation of the panels. Hence, if there appears to be some discrepancy in correlating the tables with the figures, it is due to the difficulty in obtaining realistic photographs.

Conclusions

1. Hard-chromium plate renders tool steel more corrosion resistant.
2. For a given thickness of chromium plate, greater protection is obtained on a smooth surface than on a rough-surfaced basis metal.
3. For the thicknesses tested, the corrosion protection is directly proportional to the thickness of chromium plate.

Recommendation

We recommend that mold parts to be hard-chromium plated be given a surface finish of less than 5 microinches wherever possible before plating and that chromium plate thicknesses of at least 0.0005 inch be used.

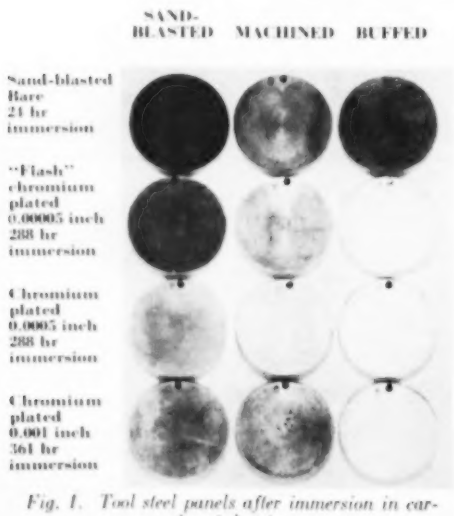
SAND-BLASTED
MACHINED
BUFFED
Sand-blasted Bare 24 hr immersion
"Flash" chromium plated 0.00005 inch 288 hr immersion
Chromium plated 0.0005 inch 288 hr immersion
Chromium plated 0.001 inch 364 hr immersion

Fig. 1. Tool steel panels after immersion in carbonated water

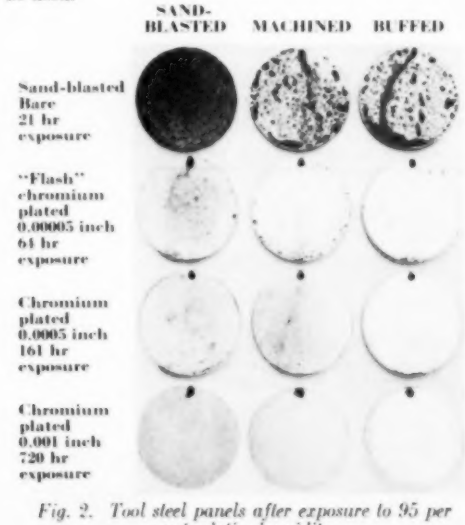
SAND-BLASTED
MACHINED
BUFFED
Sand-blasted Bare 21 hr exposure
"Flash" chromium plated 0.00005 inch 64 hr exposure
Chromium plated 0.0005 inch 161 hr exposure
Chromium plated 0.001 inch 720 hr exposure

Fig. 2. Tool steel panels after exposure to 95 per cent relative humidity

Rinsing

(*Continued from page 1017*)

$$C_t = C_{max}\left[1 - \left(\frac{V - \delta}{V + \delta}\right)^n e^{-Qt/V}\right] \qquad (4)$$

Because Qt/V is usually relatively large, $e^{-Qt/V}$ must be obtained from a table of exponentials. For approximate purposes, we may neglect the fraction $\left(\frac{V - \delta}{V + \delta}\right)^n$, and the smallest possible value of C_t/C_{max} then may be read from the curve of Fig. 3. By using equation 3 for calculating C_{max}, C_t can be obtained quite simply.

We may also estimate the time that will be required to reach substantial equilibrium in the rinse tank. From Fig. 3 it can be seen that starting with a fresh rinse, by the time the total rinse water used has equalled three times the tank volume ($QT/V = 3$), the concentration C_t is 95 per cent of C_{max}. The elapsed time t in minutes, is therefore equal to $3V/Q$; this is the most important effect of the tank volume, as far as rinsing alone is concerned.

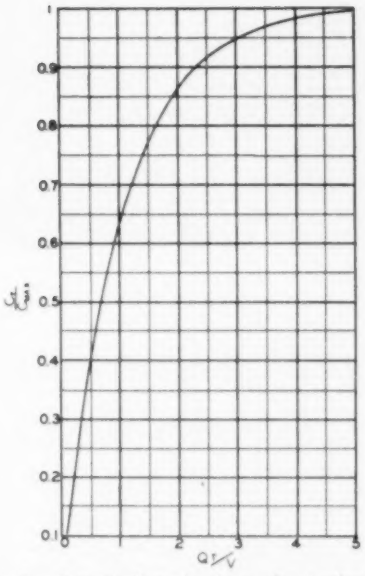

Fig. 3. Concentrations in rinse after t minutes, expressed as fraction of equilibrium concentration

Conclusions

1. Equation 3 expresses simply and exactly the limiting average concentration attained in a rinse tank at equilibrium. The range of concentration fluctuation during a rinsing cycle at equilibrium depends on the tank volume and is given with sufficient exactness by equations 1 and 2. Equation 4 is useful for following the increase in rinse tank concentration with time, and Fig. 3 may be used to estimate the relation between C_t and Qt/V.

2. The size of the rinse tank does not influence the equilibrium concentration.

3. The time required to reach equilibrium is directly proportional to rinse tank volume and inversely proportional to rate of rinse water flow.

References

[1]J. B. Kushner, Mo. Rev. Am. Electroplaters' Soc. **29**, 751 (Sept., 1942).
[2]J. B. Kushner, Plating, **36**, 798 (1949).
[3]J. B. Kushner, Plating, **36**, 915, 1130 (1949).
[4]N. McDonald, Plating, **36**, 1202 (1949) with reply by Kushner.
[5]H. L. Pinkerton, Plating, **37**, 1133 (1950).
[6]J. B. Mohler and J. Sterniska, Metal Finishing **44**, 58 (Feb. 1946).
[7]J. B. Kushner, Plating, **37**, 1234 (1950).

Isotope Dilution

(*Continued from page 1023*)

cision and accuracy of the method, the use of the isotope dilution technique is strongly recommended. Other considerations such as quicker results, no tedious weighing operations, and automatic counting further favor the use of the new procedure.

The use of this method is, of course, limited to laboratories having the necessary facilities and equipment for radiochemical work. However, the number of industrial and government laboratories having these facilities is increasing each year. It is believed that a larger number of laboratories will consider installing the necessary equipment, since major remodeling of chemical laboratories is not required to do work such as has been discussed in this article. Shortage of trained personnel, another major deterrent to the expansion of radio-chemical work, is being alleviated, somewhat, at the present time.

The author wishes to express his appreciation to his co-workers at the Rock Island Arsenal Laboratory for their assistance and to the Ordnance Corps, Research and Development Division of the Department of the Army and supervisory staff of the Laboratory for permission to publish the information in this paper.

Literature Cited

[1]S. L. Eisler, "Determination of Sulfate in Chromium Baths Using Radiobarium", Metal Finishing **50**, 71–74 (January, 1952).
[2]Z. Karaoglanov, Z. physik. Chem. **A178**, 143–156 (1937).
[3]Z. Karaoglanov, Z. anal. Chem. **106**, 129–146 (1936).
[4]G. Friedlander and J. W. Kennedy, "Introduction to Radiochemistry", John Wiley & Sons, New York (1949).
[5]G. K. Schweitzer and I. B. Whitney, "Radioactive Trace Techniques", D. Van Nostrand, New York (1949).
[6]A. H. W. Aten, Jr., Nucleonics **6**, No. 1, 68 (Jan. 1950).
[7]G. K. Schweitzer and B. B. Stein, Nucleonics **7**, No. 3, 65 (Sept. 1950).

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FRANCES M. (MRS. AUGUST R.) HOFFMAN, CLEVELAND, OHIO

Here we are again, ladies, to review our Convention in Chicago. Each year we gasp with excitement and each year we declare that this convention brought us the best times. Today we are saying, "The Chicago Convention was the best in 1952".

The opening session on Monday was full of excitement and anticipation for this was the day that a Queen was to be "made". Each lady present deposited in the box at the entrance to the grand ballroom of the Hilton a special ticket which she found in her registration book and which had her name on it. Later, the box was brought to the platform where three tickets were drawn. The first ticket was our convention Queen and the next two tickets were her attendants. The honors went to Mrs. S. Zeitman of Pittsburgh as the "Queen" and Mrs. Lawrence Davis of Jamestown, N. Y., and Mrs. S. J. Beyer of Louisville as her two attendants. This coronation ceremony was most impressive. The three ladies made a traditional picture of royalty. Only Mr. Manson Glover could have installed the trio so securely in the royal atmosphere on a royal level. Mr. Cleve Nixon, our National A. E. S. President, greeted the new Queen and presented her with a gift corsage.

Delightful memories are brought to mind by thoughts of Monday afternoon. The ladies enjoyed a special showing of the latest fashions for summer presented by Marshall Field & Company in the store's Narcissus Room, plus a very tasty and dainty tea. It gave us a birds-eye view of the daily happenings in the famous Chicago store.

Monday night was truly a "gala" affair. We had a chance to meet new friends and greet old ones. Our hosts, the Metal Finishing Suppliers Association, arranged a delicious buffet supper, along with liquid refreshments, music, dancing and prizes. The Queen received her crown together with lovely gifts for the royal trio.

The Aunt Ella Society Luncheon took place on Tuesday. Each year the ladies look forward to this traditional affair sponsored by Oakite Products, Inc. Having David N. Clarin, as our host, was truly a delightful activity in the garden of the Art Institute of Chicago. Two lucky ladies won two pieces of antique silver which "Aunt Ella" brought from the Orient and so generously shared at the party.

After the luncheon, we gathered in the Fullerton Hall of the Art Museum for a talk on art treasures of the world. This was educational as well as inspirational and we had a jolly afternoon roaming the galleries and seeing the many fine exhibits.

The East-West Ball Game brought sympathy for the losing husbands and much cheer for the winning husbands, but friendship was retained and it ended with a cry of "Wait 'til next year".

Much excitement was demonstrated on Wednesday at the Plato Party where many valuable prizes were given to the ladies. A great deal of suspense and many anxious moments were spent throughout the morning. Joan T. Wiarda was a gracious hostess and most capable in conducting the entire affair.

After the party, a very delicious luncheon was served in the famous Boulevard Room, followed by an artfully entertaining monologue given by charming Sulie Harand.

Thursday was the time we used to roam around at the Third Industrial Finishing Exposition with our husbands. We always find them pretty handy and they are so anxious to give us proper knowledge and instructions regarding plating.

Among the many educational demonstrations, we saw a working model of a barrel-plating line which coated nuts and bolts with zinc and with subsequent olive drab and bleached chromate finishes. A still-plating line plated parts with white brass followed by chromium. We received the items plated to take home with us as a useful souvenir of the Exposition. Ladies are very possessive and you can always win them to your side by giving them something of a material nature to take home with them.

The Ladies' Educational Session was held in the Saddle and Sirloin Club Ballroom. Jerry Lux of Oakite Products is a handsome gentleman who gave us many hints on how to make fun out of our work.

A final tribute was paid to our Queen and her attendants and the Ladies' chairman for next year's convention, which will be held in Philadelphia, was introduced to us. She is a most gracious "Lady" and we feel we have much to look forward to in 1953.

Our luncheon, held in the Saddle and Sirloin Club room, was delicious and we felt like members of America's multi-billion dollar livestock industry??? The Club room was designed originally for the accommodation of stock men having business in the Chicago market—the world's largest center of livestock trade.

The Annual Banquet on Thursday, followed with a Ball, was very colorful and much fun. It proved to be an adequate climax to the Chicago Convention. The food was most delicious, the floor show entertaining and very wholesome, and the music superb!

Thus ended the well organized, so ably executed, convention which took place in the resourceful and gracious city of Chicago.

Each and every lady recognized the fact that Mrs. Longfield and her committee demonstrated a feeling of warmth, patience, kindness and generosity, and were not only willing but anxious to make everyone happy and to let all the ladies live an experience which they will never forget.

Mrs. Longfield radiated charm and friendliness to each and everyone of us and our thanks go out to her.

The Committees who so untiringly worked during each project and who were so anxious to please us, made everything fun.

In behalf of all the ladies who attended the convention, may I extend to Mrs. Longfield and her committee a most grateful "thank you", and may it be resolved that their graciousness, hospitality and efforts be remembered as part of the 39th Annual Convention which was organized and executed so efficiently.

Each year we think the convention is best during that year. We say this with all sincerity. We are looking forward to Philadelphia next year. We are sure that the smiling chairman will not fail us and the Convention will be best in 1953.

project no. 5

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Acknowledgement is due the Research Committee, Dr. R. A. Schaefer, Cleveland Graphite Bronze Company, Vice-Chairman; Mr. B. C. Case, Hanson-Van Winkle-Munning Company, formerly Chairman, Research Directing Sub-Committee; and the Project Committee, Mr. L. B. Sperry, Doehler-Jarvis Corporation; Dr. J. Stareck, United Chromium, Incorporated; Mr. Joe Gurski, Ford Motor Company; Mr. Lee Morse, Chrysler Corporation; and Mr. Leslie C. Borchert, Houdaille-Hershey Corporation for their contributions to this project.

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Effect of Impurities and Purification of Electroplating Solutions

I. NICKEL SOLUTIONS

5. THE EFFECTS AND REMOVAL OF ZINC

This paper is a continuation of a series dealing with the effect of trace amounts of single metallic impurities in nickel solutions on the properties of electrolytic nickel. In a previous publication[3], copper was added to four types of nickel plating solutions and the effect on several physical properties of the deposited nickel was evaluated. In this investigation, zinc is the impurity under consideration. It is introduced into the solutions in the form of $ZnSO_4 \cdot 7H_2O$ to give the following concentrations of the metallic element: 2.5, 10, 25, 75, 150 and 300 mg/l. The changes in the physical properties of the deposits are reported as the concentration of the zinc impurity is increased. For purposes of clarity and comparison, the results are presented in the same form as that used in the copper paper. They are reported as relative changes in the properties caused by the various concentrations of zinc rather than in absolute units. Four different nickel solutions were selected for investigation—the Watts type at *p*H 2.2 and 5.2, a nickel-cobalt alloy type at *p*H 3.75 and an organic type at *p*H 3.2.

Previous studies on the effect of zinc in nickel plating solutions by other investigators fail to impart a complete and concise understanding of this problem. Diggin[2] reported that zinc in bright nickel solutions produces a dark plate in low current density areas. Gardam[5] found pitting occurs at concentrations of zinc as low as 10 mg/l, while Haring[4] states that the presence of zinc increases the throwing power of a nickel plating solution but that the effect of zinc upon the character of the deposit was more significant than that upon the throwing power. A critical review of the literature on this subject was presented by Ewing and Gordon in a previous paper[1] of this current series.

The removal of zinc from nickel plating solutions was studied. Two methods were investigated, namely low current density electrolysis and high *p*H precipitation using nickel carbonate.

Experimental

A. Preparation of Panels and Evaluation of Physical Properties

The methods employed for the purification of the nickel solutions and the preparation and subsequent testing of the deposits from these solutions were similar to those cited in a previous publication[6]. Reference panels were prepared from each of the solutions under investigation so these might serve as standards for the evaluation of deposits obtained from solutions containing varying concentrations of the zinc impurity. The reference deposits were prepared from solutions which were purified by the standard procedure[6] which is known to remove zinc and other metallic and organic impurities down to spectroscopic traces or to a concentration of less than 1 mg/l.

Initial studies on the effect of zinc in solutions for the electrodeposition of nickel indicated that this contaminant caused considerable pitting of the deposits when present in as low a concentration as a few parts per million. Consequently, the addition of a wetting agent, sodium lauryl alcohol sulfate, to the solution was deemed necessary. The wetting agent was also added to the pure

TABLE I. EFFECT OF ZINC ON THE APPEARANCE OF NICKEL DEPOSITS

Zinc Concentration mg/l	Bath Types			
	Watts *p*H 2.2	Watts *p*H 5.2	Nickel-Cobalt *p*H 3.75	Organic *p*H 3.2
0	2*	2*	mirror-bright	bright
2.5	2	2	bright	bright
10	2	2–3	semi-bright	bright
25	2	2–3	semi-bright	bright
75	2	2	semi-bright	bright
150	2	2–3	semi-bright	mirror-bright
300	bright areas	2–3	dull	mirror-bright

*Step of Eastman Grey Scale

nickel plating solutions so as to standardize the conditions under which this investigation proceeded.

B. Effects on Physical Properties

1. *Appearance.*—In addition to evaluating the vertical sections of the nickel deposited panels an attempt was made to correlate the appearance of these vertical sections with that of the corresponding current density areas of the horizontal sections. The dimensions of the bent steel panels were as follows: vertical section—2 x 3½ inches (5.1 x 8.9 cm); horizontal section—2 x 1¼ inches (5.1 x 3.2 cm). Since the cathode current density of 40 amps/ft² (4.3 amps/dm²) was used, the horizontal section of the cathode possessed low, medium and high current density areas ranging from about 8 to 50 amps/ft² (0.9–5.3 amps/dm²).

The usual difficulties in grading the degree of greyness or brightness of the two types of deposits were encountered. For the grey nickel deposits from the Watts type solutions, the method formerly reported was used[4]. The grey deposits were compared with the Eastman grey scale. This scale began with (1) as the lightest shade of grey followed by (2) as the next successively darker tone. In this investigation a value of (3) was the darkest value found. For the bright nickel deposits an arbitrary scale was chosen by the investigators. This consisted of appearance values ranging from dull to mirror-bright. Table I summarizes the effects of zinc on the appearance of the deposits from the four nickel plating solutions with regard to the general appearance of the vertical sections.

It was observed that the deposits from the Watts *p*H 2.2 solution showed no change in appearance up to and including a zinc concentration of 150 mg/l. With the addition of 300 mg/l, areas on the deposits showed a tendency toward brightness. This was further substantiated by brightening of the medium current density areas on the top horizontal section of the cathode. The very low current density areas of the cathode showed a darkening effect with less than 10 mg/l of zinc present.

The deposits from the Watts *p*H 5.2 solution evidenced a tendency toward a general overall darkening effect of the vertical section above a zinc content of 10 mg/l. Examination of the corresponding current density areas on the horizontal sections supported this observation. The very low current density regions of the cathodes were similar in appearance to those obtained from the low *p*H Watts solution.

Deposits from the nickel-cobalt type solution showed a general decrease in brightness of the vertical section with increasing concentration of zinc up to 300 mg/l. With 300 mg/l of zinc present, the deposit lost all reflectivity generally associated with a bright nickel deposit, exhibiting a non-uniform grey color. The medium current density areas on the horizontal sections followed the above trend, while the very low current density areas again showed the same darkening effect previously discussed.

The organic type coatings gained in brightness with increasing concentrations of zinc. With the addition of 150 to 300 mg/l of zinc, the electroplate exhibited an improved degree of brightness over that of the standard deposit. Blackening was found to occur at the very low current density areas beginning at a zinc content of 10 mg/l.

2. *Adherence.*—The method employed for testing the adherence of the coatings to the steel base metal was that cited in a previous publication[4]. The horizontal section of the plated panel was bent under pressure and then subjected to visual examination under a forty-power microscope. No appreciable change in the adherence of the nickel to the steel base was noted over the range of zinc concentrations of 0 to 300 mg/l and current densities of approximately 6 to 50 amps/ft² (0.6–5.3 amps/dm²).

3. *Ductility.*—Deposits were made from the four baths over the concentration range of 0 to 300 mg/l of zinc on an oxidized nickel surface. These films were stripped from the oxidized surface and subjected to the bend test[8] which consisted of repeatedly bending and creasing the plated metal layer with the fingers across a predesignated area until a break was noted. By this method comparative ductilities were evaluated as being the number of bends a deposit could withstand before fracture occurred.

While the electroplated film from the zinc-free Watts *p*H 2.2 solution was more ductile than that from the Watts *p*H 5.2 bath, deposits from both solutions decreased in ductility as the concentration of zinc increased. Little change was observed in the ductility of coatings from the cobalt-nickel solution until a concentration of 300 mg/l was reached at which point the ductility decreased to such an extent that the deposit was totally unusable. Electrodeposits from the organic type solution did not change appreciably in ductility in the range of 0 to 300 mg/l of zinc.

4. *Throwing Power.*—This physical property was evaluated by the microscopic method, which is the standard procedure followed by this project[4]. Assuming a

TABLE II. EFFECT OF ZINC ON THE THROWING POWER OF NICKEL PLATING SOLUTIONS

Zinc Concentration mg/l	Bath Types			
	Watts *p*H 2.2	Watts *p*H 5.2	Nickel-Cobalt *p*H 3.75	Organic *p*H 3.2
	Per Cent Change			
0	0	0	0	0
2.5	+1.0	−5.5	−2.0	+6.5
10	−2.5	−5.0	+5.0	+5.0
25	−1.0	+10.0	+7.0	−5.0
75	−10.0	+1.0	+1.0	+4.0
150	−9.0	+10.0	+5.0	+2.5
300	+2.0	+10.0	+2.0	+4.5

constant cathode efficiency, any change in the thickness of the deposit from solutions containing zinc as an impurity as compared with those from a standard solution is a measure of throwing power. Table II summarizes the relative change in the throwing power of nickel solutions due to variation in the concentration of zinc.

As was previously stated, the use of a wetting agent in each of the solutions was found to be necessary to prevent excessive gassing at the cathode and subsequent pitting of the deposits which resulted in the presence of even small concentrations of the zinc impurity. However, no appreciable gassing could be detected when a wetting agent was employed.

Examination of the deposits from the Watts *p*H 2.2 bath showed that solution to exhibit a general decrease in throwing power with increasing zinc concentrations. With an increase in the *p*H of the Watts type solution up to 5.2, a decided development of this property was observed. At concentrations of 25 to 300 mg/l of zinc there was an improvement in throwing power over that possessed by the standard solution.

In general, both the bright nickel types of solutions evidenced an increase in throwing power in the presence of the zinc impurity; however, no definite trend could be established as the concentration increased.

5. *Salt Spray (Fog) Corrosion Resistance.*—Corrosion resistance tests on the nickel coatings were made according to A. S. T. M. designation B117–49T. The method of evaluating and reporting the results was presented in an earlier publication[6]. The following A. S. T. M. standard panels were used for the evaluation of the deposits during the corrosion test: No. 11 (before failure), No. 9 (at failure), and No. 7 (after failure).

Three thicknesses of electroplate—0.0003 inch, 0.0010 inch, and 0.0015 inch—from each of the four solutions containing varying concentrations of zinc within the range of 0 to 300 mg/l were subjected to the salt spray corrosion test. All specimens were cleaned with magnesium oxide prior to placement in the salt-spray chamber. The 0.0003 inch deposits were examined at fifteen-minute intervals after the first hour, while the heavier coatings were checked every hour. The results are presented graphically, relative to the failure time of pure deposits from standard solutions.

Figs. 1, 2 and 3 illustrate the effect of zinc concentration on the salt-spray corrosion resistance of nickel electrodeposits. Without exception, an increase in the zinc content of the solution resulted in an increase in the corrosion resistance properties of the coatings. Within experimental error, all thicknesses of deposits from any one solution exhibited approximately the same magnitude of increased corrosion resistance. It was observed that the two types of bright nickels showed an appreciably higher relative increase in corrosion resistance than did the grey nickel deposits over the same range of zinc concentration. However, at 300 mg/l the coatings from the nickel-cobalt alloy type solution, while exhibiting a relatively high resistance to corrosion, were very difficult to prepare and to handle due to extreme brittleness.

6. *Hardness.*—The micro-hardness tests of the nickel electrodeposits were made by A. E. S. Research Project No. 9 at the National Bureau of Standards, Washington, D. C. An Eberbach microhardness apparatus was used for the measurements

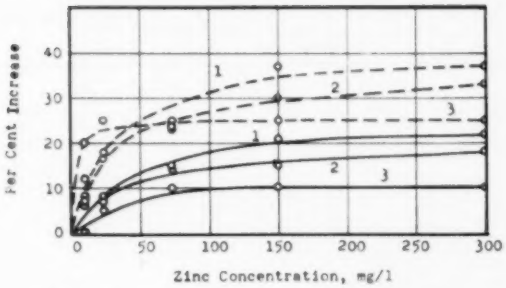

Fig. 1. Effect of zinc concentration in Watts type solutions on the salt-spray (fog) corrosion resistance of deposits of varying thickness (Curve 1: 0.0010 inch deposits; Curve 2: 0.0015 inch deposits; Curve 3: 0.0003 inch deposits). Solid line equals pH 2.2. Broken line equals pH 5.2

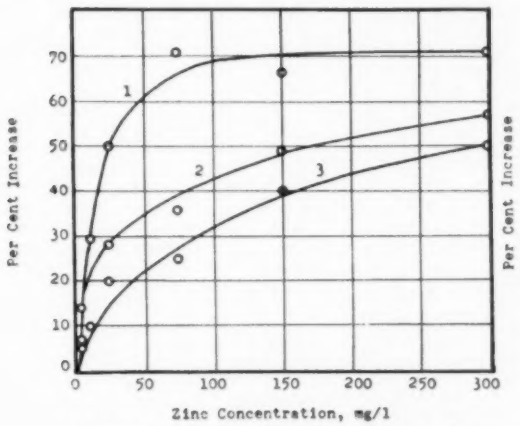

Fig. 2. Effect of zinc concentration in an organic type nickel plating solution on the salt-spray (fog) corrosion resistance of deposits of varying thickness (Curve 1: 0.0010 inch deposits; Curve 2: 0.0015 inch deposits; Curve 3: 0.0003 inch deposits)

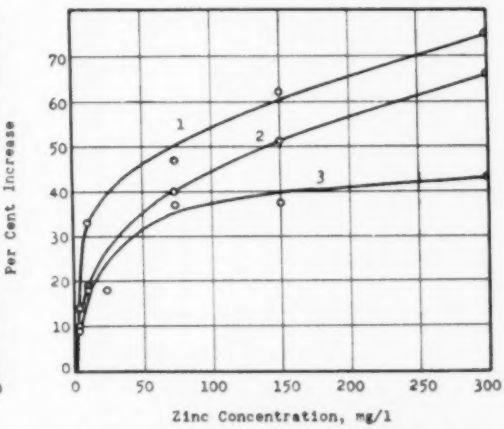

Fig. 3. Effect of zinc concentration in an alloy type (nickel-cobalt) plating solution on the salt-spray (fog) corrosion resistance of the deposits of varying thickness (Curve 1: 0.0010 inch deposits; Curve 2: 0.0015 inch deposits; Curve 3: 0.0003 inch deposits)

TABLE III. EFFECT OF ZINC ON THE HARDNESS OF NICKEL DEPOSITS

Zinc Concentration mg/l	Bath Types			
	Watts *p*H 2.2	Watts *p*H 5.2	Nickel-Cobalt *p*H 3.75	Organic *p*H 3.2
	Per Cent Change			
2.5	0	0	0	0
10	+8	0	−3	+19
25	−6	+4	+22	+56
75	+38	+27	−19	+40
150	+41	+21	−4	+21
300	+48	+33	−31	+5

of the cross-section hardness. Trends in the hardness of the nickel are presented rather than the absolute data. Table III summarizes the effects of varying concentrations of zinc in nickel plating solutions on the hardness of the plated layers.

The coatings from both the Watts *p*H 2.2 and *p*H 5.2 solutions showed a general increase in hardness on the addition of zinc up to 300 mg/l. However, with one exception, at each concentration of zinc the per cent increase in hardness of the deposits from the low *p*H bath was greater than that observed with those from the high *p*H baths. In the case of the bright nickel type solutions the hardness of the deposits passed through a maximum in the presence of 25 mg/l of zinc. This trend was more noticeable in the plated layers from the organic type bath than in those from the nickel-cobalt alloy type solution.

C. *Removal of Zinc*

1. *Procedure.*—The investigation of methods for zinc removal from nickel solutions was limited to two procedures. These were low current density electrolysis and high *p*H precipitation with nickel carbonate.

The procedure for the preparation of the solutions and plating of the panels, and the apparatus employed was that described in a previous publication[6]. To determine the optimum current density for the electrolytic removal of the impurity runs were made at 1, 2, 4 and 6 amps/ft² (.1, .22, .43, .64 amps/dm²), at the operating temperature of the baths with an agitation rate of 4 feet of solution per minute past the cathode. Flat steel cathodes were used with a dimension of 3½ x 2 inches (8.9 x 5.1 cm). All runs were carried out in one liter baths initially containing 300 mg of zinc.

The high *p*H removal of zinc was investigated as follows: Nickel carbonate was added to the four nickel solutions under consideration, each possessing an initial concentration of 300 mg/l of zinc and a *p*H value of 2. The reagent was introduced into the solutions in amounts necessary to give *p*H values over a range of 2.2 to 6.1. Aliquots of each solution were taken at *p*H intervals. These were filtered and allowed to stand for a period of a few days to insure as near equilibrium conditions as possible. Subsequently, the samples were re-filtered and the *p*H checked. The final zinc concentration at each *p*H interval was determined by a colorimetric analytical procedure set forth by Serfass *et al.*[7] The entire analytical procedure was carried out at a temperature of 25 ± 2° C (77 ± 4° F).

2. *Evaluation of Results.*—The data obtained on the electrolytic removal of zinc from the four nickel solutions studied indicated that similar trends were followed in each solution. On the basis of ampere hours of current consumed per gallon of solution, zinc was removed most efficiently down to a concentration of 50 mg/l by a current density of 4 amps/ft² (0.43 amps/dm²). At lower concentrations of the impurity, a current density of 2 amps/ft² (0.22 amps/dm²) was found to be the optimum for removal. Fig. 4 illustrates the electrolytic removal of zinc from nickel plating solutions at these optimum current densities. If time were the important factor in the removal of the impurity, a current density in the range of 4 to 6 amps/ft² (0.43–0.65 amps/dm²) could be utilized for a more rapid depletion of the zinc. This, however, would be accompanied by a much higher expenditure of metallic nickel, since the ratio of nickel : zinc deposited increases sharply at the higher current densities.

The results of high *p*H precipitation as a method of removing zinc from nickel solutions are shown in Fig. 5. This procedure was found to be of little value in removing the impurity below a concentration of 250 mg/l. At a *p*H where this concentration of zinc still remains within the solubility limit (*p*H 6.1), appreciable amounts of nickel already have begun to precipitate from solution. This factor places a severe limitation on the application of high *p*H precipitation in the removal of zinc.

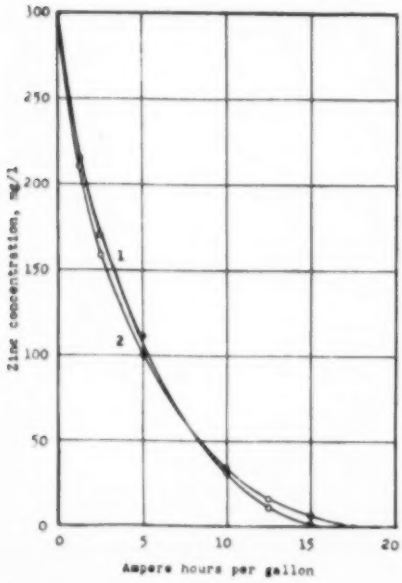

Fig. 4. Composite curves showing the electrolytic removal of zinc from four nickel plating solutions at 50—55° C. Curve 1 is for 2 asf (.22 amps/dm²); Curve 2 for 4asf(.43amps/dm²)

Summary

The results of this investigation on the effects of zinc in nickel solutions on the physical properties of the deposits and the removal of zinc from these solutions may be summarized as follows:

No change in the appearance of the coatings from the Watts *p*H 2.2 solution

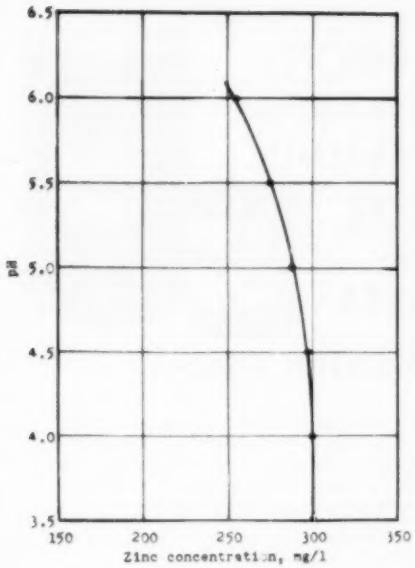

Fig. 5. Composite curve showing the removal of zinc from the three nickel plating solutions by precipitation with nickel carbonate

occurred until a zinc concentration of 300 mg/l was reached. At this point, there appeared to be a tendency toward brightening of the electroplate. A general overall darkening of the Watts *p*H 5.2 deposits resulted from zinc concentrations in the range of 10 to 300 mg/l. The presence of zinc in the alloy type bright nickel solutions resulted in a general decrease in the brightness of the deposits. A concentration of 150 to 300 mg/l of zinc enhanced the brightness of organic type coatings. Deposits from all solutions exhibited a darkening effect in the very low current density areas (below 10 amps/ft², 1.1 amps/dm²) beginning at zinc concentrations of 10 mg/l.

Concentrations of zinc in the range of 0 to 300 mg/l caused no change in the adherence of the deposits to the steel base metal.

An increase in the zinc concentration of the Watts type solutions resulted in a general decrease in the ductility of the plated layers. No appreciable change in the ductility of the bright nickels was affected by zinc concentrations of 0 to 150 mg/l. At 300 mg/l the nickel-cobalt type coatings were extremely brittle and highly stressed.

A slight decrease in the throwing power of the Watts *p*H 2.2 solution resulted from from the presence of 10 to 300 mg/l of zinc. The other three nickel solutions showed a general increase in throwing power within the range of 0 to 300 mg/l of zinc. In each case no definite trend was evident.

An increase in the zinc content of all solutions resulted in a general increase in the corrosion resistance of the deposits. The organic and nickel-cobalt alloy type electroplated films exhibited a larger increase in resistance to corrosion than did the Watts type deposits.

Zinc concentrations of 10 to 300 mg/l generally caused an increase in the hardness of the nickel plated from the Watts type (*p*H 2.2 and 5.2) and organic type solutions. Certain concentrations of the impurity resulted in a slight decrease in the hardness of the nickel from the alloy type solution.

Zinc can be removed by electrolysis from nickel plating solutions most economically at optimum current densities of 2 to 4 amps/ft² (.22–.43 amps/dm²). This method permits removal of the impurity in solution to below a concentration of 1 mg/l.

Concentrations of zinc below 250 mg/l cannot be removed from nickel solutions by the high *p*H precipitation method without appreciable loss of nickel. The method is, therefore, not recommended for the removal of zinc from nickel plating solutions.

REFERENCES

[1]D. T. Ewing, R. J. Rominski and W. M. King, Plating 37, 1157–1160 (1950).

[2]M. B. Diggin, "The Purification of Electroplating Solutions". (Address given before the Detroit Branch, A. E. S., November 2, 1945.)

[3]G. E. Gardam, J. Electrodepositors' Tech. Soc., 22, 8–13 (1947).

[4]H. E. Haring, Monthly Rev., Am. Electroplaters' Soc., 11, 4–13 (1924).

[5]D. T. Ewing and W. D. Gordon, Plating, 36, 56–60 (1949).

[6]D. T. Ewing, R. J. Rominski and W. M. King, Plating, 36, 1137–1145 (1949).

[7]E. J. Seeftan, W. S. Levine, P. J. Prang and M. H. Perry, Plating, 36, 818–823 (1949).

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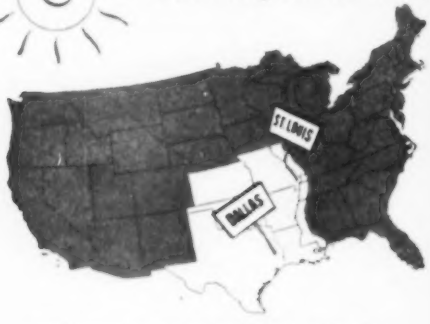

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Contact the Executive Secretary

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Subject:
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DR. DODD CARR, Chemist
Subject:
Nickel Electroforming

BART-MESSING CORP. (c)
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EDUARDO REDLHAMMER, Vice-President and SIDNEY MITWOL, Chief Engineer
Subject:
Selenium Rectifiers for Electroplating Applications

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P. O. Box 20033, Houston 25, Texas
Western Area (Arizona, California, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Washington, Wyoming)
MARSHALL H. ODEEN
820 Mission, South Pasadena, Calif.
Subjects:
1. *pH Control in the Electroplating Industry*
2. *Spectrophotometric Determination of Plating Solution Impurities*

BEHR-MANNING CORP. (c)
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Contact HENRY J. SIDFORD, Manager, Sales Promotion
Subject:
Grinding and Polishing with Coated Abrasives

BETHLEHEM STEEL CO. (c)
Bethlehem, Pa.
Contact S. H. YORKS, Publications Department
Selected Subjects
Movie: *Steel-Plus (Versatile Tin Plate—Its Production and Widespread Use)* and 10 other sound films

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M. H. ORBAUGH, Head Electroforming Department
Subject:
Electroforming

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EARL W. ARNOLD, Technical Service Director
Subject:
General Plating and Metal Finishing

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Subject:
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B. H. GARDNER and K. P. BELLINGER
Subject:
Polyester Resin-Bonded Fiberglas and Its Use in Tanks, Ducts, Hoods, Pipes, Drains (movie available with talk)

THE DURIRON CO., INC. (c)
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Subject:
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THE ELECTRIC PRODUCTS CO. (c)
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E. G. SCHROEDER, Sales Manager with G. J. Doss, Assistant Sales Manager as alternate
Subject:
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HERBERT M. GOLDMAN, Chemical Engineer
Subjects 1, 2, 3, 4, 5
DR. WALTER R. MEYER, President
Subjects 2, 3, 4, 5
C. C. HELMLE, Secretary
Subject 5
Subjects:
1. *Tumble Finishing of Metals*
2. *Plating Upon Aluminum*
3. *Blackening and Coloring of Metals*
4. *Conversion Coatings*
5. *Adhesion of Electrodeposits and New Methods of Cleaning and Oxide Removal*

FORD MOTOR CO. (c)
3000 Schaefer Rd., Dearborn, Mich.—Any Branch
JOSEPH GURSKI, Supervisor, Materials and Processes Section, Manufacturing Research Department, Ford Motor Co.
Subject:
Plating Applications to Automotive Parts. The Company has a number of educational movies available for Branch showings which are of general interest, not pertaining to electroplating.

FORMAN MFG. CORP. (c)
3171 Bellevue, Detroit 7, Mich.—Any Branch
HOWARD J. MCALEER, President, and EDWARD W. MCALEER, Vice-President
Subject:
Polishing and Buffing Materials and Their Applications

GENERAL CHEMICAL DIVISION (c)
40 Rector St., New York 6, N. Y.—Any Branch
CLIFFORD STRUVE, Technical Service Division
Subject:
Plating from Fluoborate Solution

GENERAL MOTORS CORP.
Brown-Lipe-Chapin Division (b or c)
Ontario and Marcellus Sts., Syracuse, N. Y.—Any Branch within reason
NEIL C. MAFFEI, Supervisor of Process Engineering, and JOHN J. TIERNEY
Subject
General Interest Topics
Guide Lamp Division (c)
P. O. Box 1090, Anderson, Ind.—Midwest
R. W. OYLER, Plating Engineer
Subject
To be announced
Oldsmobile Division (c)
Lansing 21, Mich.—Geographical limits to be determined
R. W. REDMOND, Senior Engineer
Subject:
Prefinishing of Steel Prior to Plating

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Subject:
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Subject:
Selenium Rectifier Units for Electroplating

HAMMOND MACHINERY BUILDERS, INC. (b or c)
1600 Douglas Ave., Kalamazoo, Mich.—Geographical limitations subject to negotiation
RAMSAY M. BELL, Technical Manager
Subject:
Mechanical Polishing and Modern Finishing Trends

HANSON-VAN-WINKLE-MUNNING CO. (c)
Matawan, N. J.—Any Branch
E. C. BOSL, B. C. CASE, M. B. DIGGIN, P. R. LYONS, M. J. MOLL, A. D. SQUITIERO
Selected Subjects

THE HARSHAW CHEMICAL CO. (c)
1945 E. 97th St., Cleveland 6, Ohio—Any Branch ordinarily within reason
DR. M. M. BECKWITH, Manager, Technical Sales-Electroplating, and A. H. DU ROSE, Manager, Research-Electroplating
Subject:
Topics to be selected. General subjects will be related to electroplating

GEORGE B. HOGABOOM (b)
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Any Subject

THE INTERNATIONAL NICKEL CO., INC. (c)
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CLARENCE SAMPLE, Subjects 1 and 2
W. H. PRINE, Subject 3
1. *Specifications and Tests for Electrodeposited Coatings*
2. *Corrosion Behavior and Protective Value of Electrodeposited Coatings*
3. *Practical Aspects of Industrial Nickel Plating*

Color Movie, "*Corrosion in Action*", with sound track

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Subject:
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Movie available entitled, "*What Happens in a Plating Barrel*"

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16 Cherry Ave., Waterbury 20, Conn.
DR. H. L. KELLNER, Technical Director—East and Midwest
Subject:
Bright Copper Plating
ELLSWORTH T. CANDEE, Director of Research—East and Midwest
Subject:
Polishing and Buffing

METAL AND THERMIT CORP. (c)
100 E. 42nd St., New York 17, N. Y.—Any Branch
DR. FREDERICK A. LOWENHEIM, Research Chemist
P. O. Box 471, Rahway, N. J.
Subjects:
1. *Alkaline Tin Plating*
2. *The Plating of Tin Alloys*
3. *Immersion Tinning*

J. C. MILLER CO. (c)
631 Chestnut St., S. W., Grand Rapids 3, Mich.—Any Branch except in Far West
J. A. BADALUCCO, Vice-President and Director of Research
Subjects:
1. *Tripoli as an Abrasive*
2. *Development and Manufacture of Tripoli Buffing Compositions*
W. L. MORGAN, Plant Manager and Finishing Engineer
Subject:
Practical Application of Buffing and Polishing

MINE SAFETY APPLIANCES CO. (c)
Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa.—Any Branch
Contact C. H. MEHAFFEY, Assistant Manager for nearest speaker
Subject:
General talks on health hazards and safety in plating operations
There is an educational movie available, "*The Air We Breathe*"—(20-minutes-sound)—covering the common types of air contaminants found in industrial processes and the personal protective equipment used to prevent the worker from breathing them

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330 W. 42nd St., New York 36, N. Y.—Any Branch
A. B. MINDLER and C. F. PAULSON, Special Applications Department
Subjects:
1. *Recovery of Metals in the Plating Shop by Ion Exchange*
2. *Application of Demineralized Water in the Plating Room*

SARCO COMPANY, INC. (c)
350 Fifth Ave., Empire State Bldg., New York 1, N. Y.—Any Branch

Address correspondence to A. MILNES for nearest speaker
Subject:
Heating, Cooling, and Temperature Control of Electroplating Processes

SEL-REX PRECIOUS METALS, INC. (c)
229 Main St., Belleville 9, N. J.—Any Branch
EDWIN C. RINKER, Technical Director
Subject:
Bright Gold Plating

FOSTER D. SNELL, INC. (c)
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DR. FOSTER DEE SNELL, President; IRVING REICH, alternate
Subject:
Detergency and Surface Activity (with lantern slides)

SULPHUR PRODUCTS CO., INC. (c)
Greensburg, Pa.,—Any Branch
WILFRED S. MCKEON, President
Subjects:
1. *Copper Stripping Non-Dangerously*
2. *The Why and How of Cleansing Cyanide and Zinc Solutions*

TUMB-L-MATIC, INC. (b or c)
4510 Bullard Ave., New York 70, N. Y.
THOMAS L. RENART, Development Engineer
Subject:
Preparation of Metals by Tumbling for Plating

UNITED CHROMIUM, INC. (c)
100 E. 42nd St., New York 17, N. Y.
R. K. GUFFIE, Subjects 2, 3, 4 and 5
F. FULFORTH, Subjects 4 and 5
J. M. HOSDOWICH, Subjects 1, 4 and 5
W. S. CIBULSKIS, Subjects 1 and 2
E. N. RIOTTE, Subjects 4 and 5
Waterbury 90, Conn.
DR. G. DUBPERNELL, Subjects 4 and 7
W. GAUNT, Subject 5
M. SHACAT, Subjects 1, 2, 3, 4 and 5
Carteret, N. J.
D. MESERVE, Subject 6
F. L. SCOTT, Subject 6
1700 E. Nine Mile Rd., Ferndale Sta., Detroit, Mich.
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J. J. HANNEY, Subjects 2 and 3
DR. J. E. STARECK, Subjects 3 and 4
I. M. WEISS, Subject 2
3970-A Jamieson Ave., St. Louis 9, Mo.
HENRY DEWITT, Subjects 2, 4 and 5
208 S. LaSalle St., Chicago 4, Ill.
C. W. CARTER, Subjects 1, 2, 4, 5 and 6
A. LINN, Subjects 1, 2, 3 and 4
E. M. RELITZ, Subjects 1, 4 and 5
2304 Needmore Rd., Dayton, Ohio
E. W. REHME, Subjects 2 and 6
923 E. Third St., Los Angeles 13, Calif.
C. G. BORLET, Subjects 1, 2, 4, 5 and 6
15 Emily St., Toronto, Ontario, Canada
JAMES GUFFIE, Subjects 1, 2, 4, 5 and 6
Subjects:
1. *Chromium Plating*
2. *Copper Plating from Pyrophosphate Baths*
3. *Electrocolor and Patternplate*
4. *Anozinc and Dip Conversion Coatings for Zinc*
5. *Rack Coatings and Plating Stop-Offs*
6. *Organic Finishes and Protective Coatings*
7. *Plating Literature*

WALLACE AND TIERNAN CO., INC. (c)
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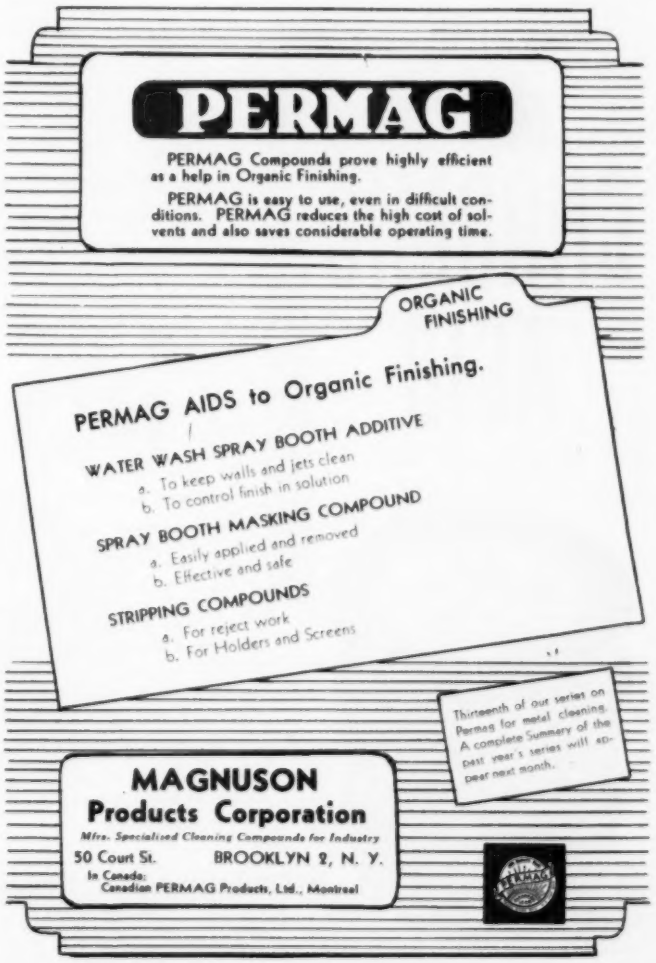
A. E. GRIFFIN, Director, Technical Service Division
N. S. CHAMBERLIN, Sanitary Chemist, Technical Service Division
H. B. SNYDER, JR., Manager, Sewage and Industrial Waste Sales
Subject:
Cyanide and Chromium Waste Disposal Methods and Equipment

LEWIS WEISBERG (c)
71 W. 45th St., New York, N. Y.—Any Branch
Subject of talk to be arranged

WYANDOTTE CHEMICALS CORP. (c)
Wyandotte, Mich.
P. N. BURKARD, Manager, Industrial, Railroad and Aircraft Detergents
Subject:
Frontiers in Metal Cleaning
ROBERT J. RACINE, Manager, Industrial Sales
Subject:
Behind the Metal Cleaner Label
HAROLD R. SUTER, Director of Application Research
Subject:
Radioactive Tracers in Testing Metal Cleaners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Washington Orders

Copies of NPA orders and publications may be obtained from National Production Authority, Washington 25, D. C., or from any of its local offices.

Allotment and DO numbers and symbols.—A revised list of July 22 contains five additional symbols: B-5 (suffix to DO ratings A, B, C, E, and Z-2 as described in Amendment 3 to CMP regulation 1); E-4 (Canadian Atomic Energy Program); W-6 (MRO for iron and steel producers—NPA order M-105); Y-9 (General Industrial Equipment Bureau); AS (Surplus aluminum purchases from sources other than mills—NPA Order M-88).

Cadmium and Lead.—These metals were removed from inventory control on May 16 by revision of NPA Regulation 1. Controlling orders have been revoked.

Copper.—The increased availability of foreign copper which recent price adjustments have made possible and the general softening of world prices of the metal have resulted in an improved supply situation, though the metal continues in critical supply. This improved condition is reflected in various amendments to government orders. Direction 1 to Order M-50 on July 22 grants temporary relief from inventory restrictions; Order M-97 on copper use limitations in the manufacture of lighting fixtures was revoked on July 18; while an amendment to Order M-80 on July 22 permits distributors of copper wire mill products to build inventories up to their historical position by placement of orders for each month at 150 per cent of previous months sales.

List of Basic Materials and Alternates.—The softening movement noted in Issue No. 6 of April 30 with regard to metals and chemicals continues in Issue No. 7 of July 8. The "most critical" designation has been removed from aluminum, copper, and tin; zinc is now in Group III, in "fair-to-good supply". Among the chemicals in Group I ("In Short Supply"), carbon disulfide, carbon tetrachloride, and trichlorethylene are moved to Group II (in approximate balance) and hydrofluoric acid and its derivatives are moved to Group III. Barium chemicals and boric acid are now in Group III after the previous "in approximate balance" listing. Caustic soda, caustic potash and soda ash have been removed from Group III entirely because they are in plentiful supply.

Reflecting the continued softening picture, NPA Inventory Regulation 1 on July 23 removed inventory controls from more than 50 widely varied commodities; included were hydrofluoric acid and its derivatives, orthophosphoric acid, polytetrafluorethylene (teflon) scrap tin, scrap zinc, GR-S and butyl types of synthetic rubber. In the same regulation, however, selenium was added to the list of "currently in short supply".

Nickel.—A slight easing of the supply situation is noted in the report of the Electroplating Industry Advisory Committee meeting held on June 13. The NPA exploratory proposal to permit use of nickel as a "flash" undercoat prior to chromium for items now on the prohibited nickel use list was welcomed as a lifesaver, particularly for plants located in non-industrial areas. The committee requested an early decision on this proposal.

Rubber.—The July 22nd amendment to Order M-2 served to remove most of the controls regulating the acquisition and consumption of natural and synthetic rubber. See Inventory Regulation 1 above. However, restrictions on the use of natural crepe and limitations on the purchase of dry cold GR-S are retained.

Sulfuric Acid.—The sulfuric acid supply picture has improved sufficiently to result in the industry advisory committee recommendation on June 11 of a revocation of controlling order M-94. The NPA is studying the effects such revocation might have in relationship to the Sulfur Use Restriction Order.

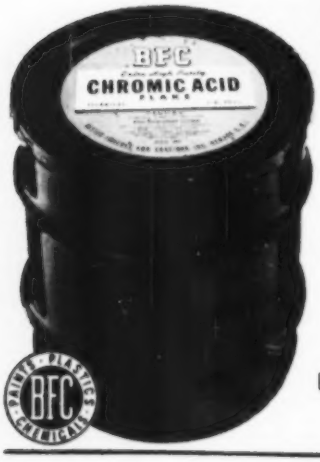
Tin.—An amendment of July 18, to Order M-8 permits the use of a limited amount of tin for products and processes prohibited previously. Usage of 25 per cent of the 1950 quarterly average amounts are now permitted upon proper certification in the following items: jewelry, novelty souvenirs, toys and games, hollow-ware, buckles, buttons, advertising specialties and the like. Upward revisions of tin containing solders have been made and use of 40 per cent tin solder is allowed without certification. The use of tin for new fluid milk containers has been placed under the general quota provisions of the Order, special authorizations for such usage no longer being required.

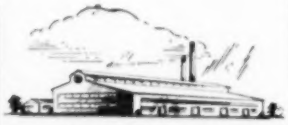
Zinc.—NPA Regulation 1 has been amended as of June 30 to comply with the revocation of Order M-9 which removed all inventory controls over zinc.

EXTRA HIGH QUALITY 99.7+% PURE

CHROMIC ACID

TECHNICAL GRADE—FLAKE





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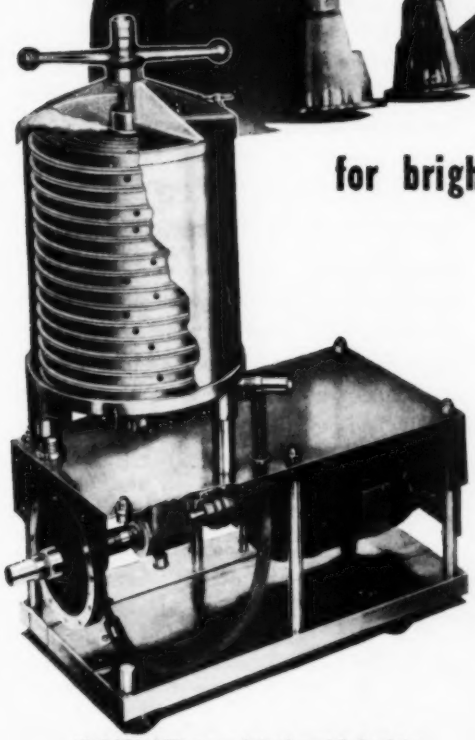

"Sealed-Disc" Filters were designed especially for plating rooms. They're smaller, compact and more portable than ordinary conventional filters, yet they are capable of handling equal volumes of solutions. "Sealed-Disc" Filters are also performing satisfactory results on many acid dips, electro cleaners, and solvents.

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QUESTION BOX

readers' questions of general interest

Q. 143. Our company is interested in a quick means of production testing the thickness of sulfuric anodic coatings on aluminum alloys. Do you have any information providing a relationship between salt spray resistance and dielectric strength of anodic coatings?

A. The salt spray resistance of anodic coatings is not a measure of the thickness of the coatings, a thin dense coating may give better resistance than a thick porous coating. A number of methods have been employed for the determination of the thickness of anodic coatings, stripping of the coating is most widely used. Both stripping and microscopic methods are described in the Proceedings, American Society Testing Mats. **37**, 261 (1937) and ibid, **40**, 959 (1940). A voltage breakdown method is given in the same publication, **40**, 978 (1940). The use of an electronic heat-frequency oscillator is described in the A. S. T. M. Bulletin for October, 1947, page 47. The Filmeter as this instrument is called should give rapid production results.—D. G. Foulke.

Q. 144. For some time we have had a problem of masking gears off so that we may copper plate them approximately 0.002 inch. So far everything we use will either break down under our various operations; caustic, copper strike, etc., or if it held up we have a terrible time trying to remove same after plating. Any information you may furnish will be greatly appreciated.

A. In order to hold the plating line to the place desired, obviously, a material of good adhesive qualities is required. Just as obviously such a material is hard to remove, so that a trick must be employed to do a good stop-off job in this case. One successful method is as follows: First, place a piece of pressure sensitive electroplating tape not quite to the edge to be held. Without using any primer, dip in or paint with a plastisol rack coating to the point where protection is desired. The mechanics of this procedure can be easily worked out, particularly if the complete tooth is to be stopped-off.

In some cases it is the practice not to machine to size those areas to be hardened. The whole part is then copper plated, followed by machining to size at which time the copper and some steel is removed. It is assumed that the high melting point waxes have been tried and found unsuitable in this case.—Louis Donroe.

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as a constant cleanser and purifier

It will:

1. Precipitate heavy metal impurities.
2. Co-precipitate copper impurities, eliminating need for zinc dust treatment.
3. Minimize need for decanting or filtering.
4. Precipitate excessive carbonates.
5. Reduce brightener consumption.

Try a 5-gallon can, $15.00, or a 15-gallon drum, $42.75, on 30 days' approval.

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Greensburg Pa. 8

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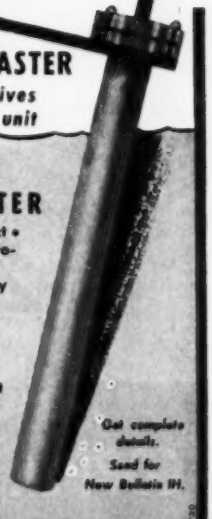

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Article Abstracts

No copies of articles are available at the offices of "Plating". Photostats may be had from libraries having files of the journal in question and offering photostat service, usually at 30-50 cents a page. Ask your public library to consult the Union List for names of libraries having the particular journal. Abbreviations used are those of Chemical Abstracts.

Removal of Stearic Acid from Surfaces by Alkaline Detergents. Fred Hazel and Wm. Stericker. Ind. Eng. Chem. **43**, 919–925 (April, 1951).

Various alkaline chemicals used as cleaners were tested for their ability to remove "stearic acids" of different melting ranges from zinc, aluminum, steel, and, for comparison, glass surfaces. The results should be helpful in formulating polishing and buffing compounds and in setting up conditions for their removal from diecastings.

The Properties of Metallic Coatings Produced by Evaporation and Sputtering. S. Tolansky. J. Electrodepositors' Tech. Soc., **28** (1952).

A comparison of the advantages, disadvantages, and limitations of these two methods of producing a metallic coating in a vacuum. Details and techniques are described, including a superior evaporation technique developed by the author. The coating of the 200-in. mirror now in the Mt. Palomar Observatory telescope is described.

The Electrodeposition of Tin-Antimony Alloys from Chloride-Fluoride Electrolytes. J. W. Cuthbertson and N. Parkinson. J. Electrodepositors' Tech. Soc. **28** (1952).

This amounts to a progress report on a project which is being continued. Alloys of tin and antimony containing up to 45 per cent of antimony have been satisfactorily deposited from solutions containing the chlorides of the two metals, a fluoride, and an addition agent. Bright plate can be deposited. Alloys of this type may be important in the bearing field.

Sprayed Aluminum Coatings for the Protection of Steel. T. P. Hoar, Electroplating, **5**, 171–174 (1952).

Aluminum coatings, spraying being the only practical method of application, were studied in terms of a substitute for zinc. The powder and wire methods are discussed. The use of composite aluminum-zinc coatings is described and it is claimed that technical advantages obtain in that the outer aluminum coating is in many cases less quickly corroded than zinc, while the zinc undercoat takes care of any trouble that might arise at pores in the aluminum in the early stages of exposure. Sprayed coatings as a basis for paint and heat treatment of sprayed coatings are discussed.

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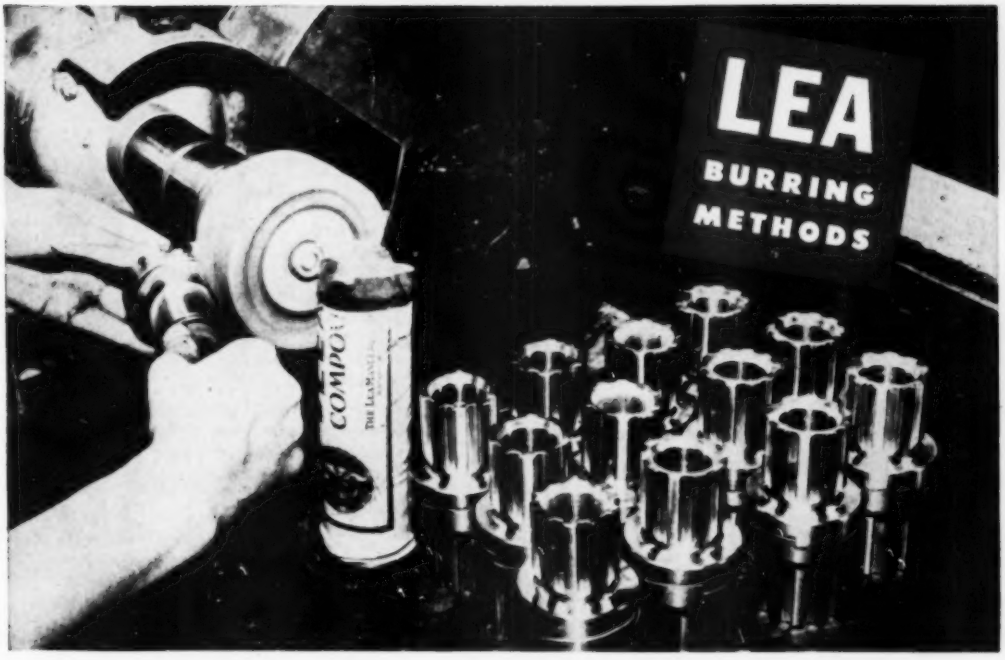

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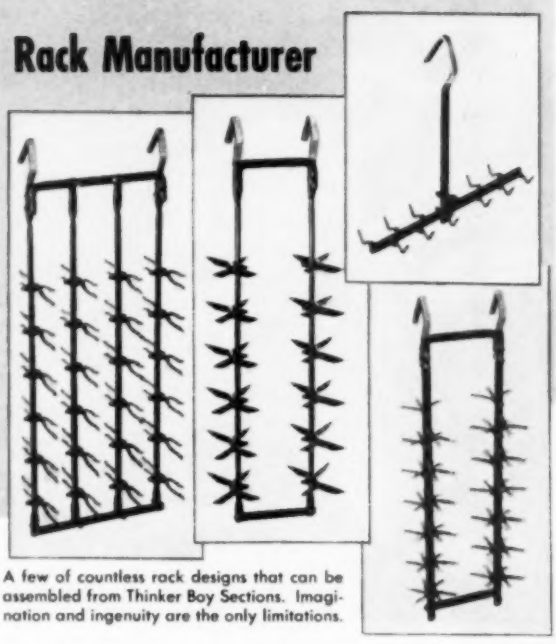

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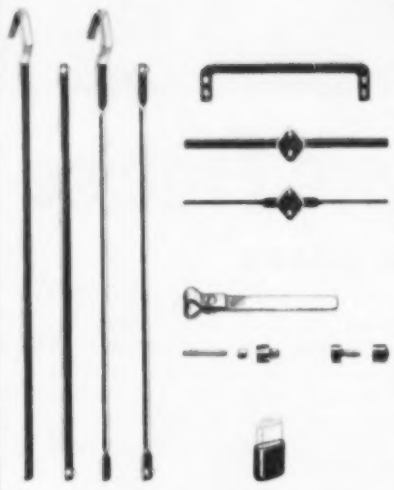

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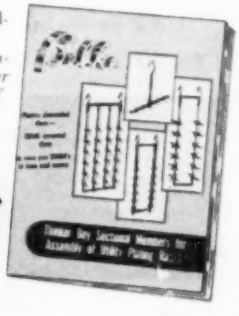

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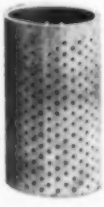

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Article Abstracts

An Electron-Diffraction Investigation of the Electrodeposited Coatings on Iron Single Crystals. D. J. Evans and M. R. Hopkins. J. Electrodepos. Tech. Soc. **28** (1952).

A purely academic paper dealing with the crystallographic structure of zinc, copper, and nickel deposited from different plating baths under varying conditions, on iron single crystals. Several sketches.

The Crystal Structure of Electrodeposited Silver. D. N. Layton. J. Electrodepositors' Tech. Soc. **28** (1952).

The crystal orientation in silver electrodeposits from different cyanide baths has been investigated by the electron diffraction method. It is either face-centered cubic or a mixture of this with hexagonal. Both these lattices represent the closest possible packing of the atoms. Sketches, photomicrographs, and electron diffraction patterns are presented.

A Non-Electrolytic Smoothing Treatment for Steel. W. A. Marshall. J. Electrodepositors' Tech. Soc. **28**, 27–46 (1952).

Optimum composition for a solution found to brighten steel by simple immersion was:

Oxalic Acid	2.5 g/100 ml
Hydrogen Peroxide	1.3 g/100 ml
Sulfuric Acid	0.01 g/100 ml

At room temperature with no agitation, optimum time was 50 minutes, for mild steel polished with 0 grade emery paper. Agitation is detrimental. Steel removed is 0.00036 inch. The process is accompanied by a temperature rise and periodic gassing (3–4 second). The gas was found to be at least 95 per cent oxygen. Only .10 per cent carbon steel develops appreciable reflectivity. Higher carbon steels and at least some alloy steels are smoothed and semi-bright. A protective film, probably monomolecular, remains on the surface after treatment. Some smut also remains, which is readily wiped off, or washed off with

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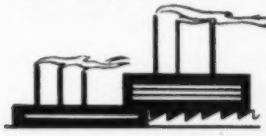

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Article Abstracts

a strong stream of water. Nickel may be deposited on the surface with excellent adhesion. Photomicrographs, photographs, graphs, sketches and tables are presented. A British patent has been applied for. No mention is made of a U. S. patent application.

Heavy Chromium Plating of Crankshafts. Electroplating and Metal Finishing **4**, 127–128 (April, 1951).

Gives details of solutions and operating conditions used by a European plant. Also describes two methods for stripping faulty deposits.

The Electrodeposition of Silver-Cadmium Alloys. Isvaran Nambissan and A. J. Allmand. Trans. Faraday Soc. **47**, 303–314 (March, 1951).

The above from complex cyanide solutions, at controlled cathode potentials was studied. The alloys used contained 1.6–100 per cent Ag. Results are tabulated, plotted, and explained in terms of the deposition of primary lattices of α, ξ, δ, and ϵ types, depending on conditions.

Chromium Plating of Large Drying Cylinders. A. H. Loveless, Ind. Chemist and Chem. Mfr. **27**, 166–170 (April, 1951).

Describes plant for chromium plating of large cast-iron cylinders.

Chromium Plating with the Bornhauser Chrome Solution. Frank Taylor. Electroplating **5**, 109–113 (1952).

The composition, operating conditions and equipment for a chromium plating solution designed primarily for plating directly on zinc base die castings are given. This solution is made up to contain chromic acid, 53 oz/gal, caustic soda 7.7 oz/gal, trivalent chromium (as Cr_2O_3), 1.0 oz/gal, sulfuric acid 0.1 oz/gal, and is operated at 60° to 70° F at 200 to 900 amp/sq ft. In comparison with the conventional bright chromium plating solution, throwing power and cathode efficiency are reported to be much better. The deposit is dull and gray, but it is soft and fairly easily polished.

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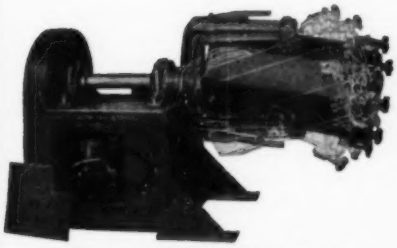

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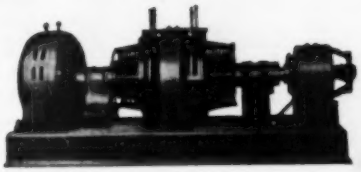

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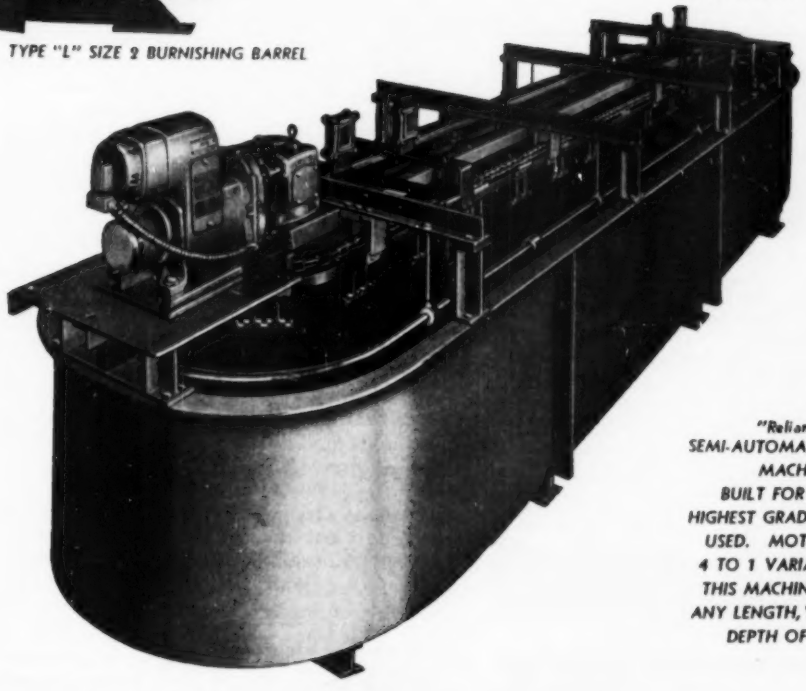

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Patent Abstracts

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No. 2,594,881, April 29, 1952—Electrode for Chromium Plating—L. G. DeQuasie and R. F. Eisenberg, assignors to Rochester Lead Works, Inc., Rochester, N. Y.

CLAIM. A one-piece lead-containing chromium plating anode approximately 3 inches wide and 3/16 inch thick with a single suspending hook portion of the same material, the body portion and hook portion having a continuous rib extending endwise and centrally thereof on their front and body portion having outer ribs extending endwise thereof on its front and spaced from said central rib and from the side edges, the surfaces on said body and hook portions adjacent to the central rib being inclined from said central rib inwardly toward the side edges of the hook portion and toward the outer ribs of the body portion, and the back of the body and hook portions having an arcuate enlargement extending endwise and centrally thereof, the anode having a minimum thickness throughout of approximately 3/16 inch and the hook portion being resistant to bending.

1 claim, 4 figures.

References cited: U. S. Patents 1,019,588; 1,833,806; 2,125,037; 2,331,320. Great Britain 1,769. Canning "Practical Handbook on Electroplating" 11th ed., 1932, p. 83.

No. 2,594,933, April 29, 1952—Process for Electrodepositing Hard Nickel Plate—B. B. Knapp and D. S. Carr, assignor to International Nickel Company, Inc.

CLAIM 1. A process for electrodepositing nickel of high hardness which comprises establishing a nickel electroplating bath containing 300 to 375 grams per liter of nickel sulfate, 30 to 60 grams per liter of nickel chloride, 30 to 45 grams per liter of boric acid, 0.0018

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Patent Abstracts

to 0.015 mole per liter of nickel as an addition agent, said addition agent consisting essentially of an aqueous phosphite solution having nickel and phosphite radical in a ratio of about 1 mole of nickel for about 2 to 2.2 moles of phosphite radical, and the balance essentially water, electrodepositing nickel therefrom at a cathode current density of 20 amperes to 50 amperes per square foot at a cathode disposed in said bath, the *p*H of said bath within a range of 1.7 to 3.0, and while controlling the temperature of said bath throughout the foregoing operations within a range of 140° F to 150° F, thereby a hard nickel plate is produced at the cathode having a hardness as high as about 450 Vickers.

3 claims, 1 example.

References cited: U. S. Patents 2,331,751; 2,338,529; 2,430,581; 2,532,283. Brenner et al. Proc. Am. Electroplaters' Soc. (1947), pp. 156–160.

No. 2,595,681, May 6, 1952—Plating Point Assembly for Electroplating Racks—E. E. Liles, Harvard, Ill.

CLAIM 8. A contact assembly to receive a plating point on an electroplating rack, comprising: an uninsulated, metal core having a base for metal-to-metal attachment to an electroplating rack and to receive a protective dielectric coating which also covers said rack, said core being constructed to loosely receive a transversely extending dielectric jacketed metal plating point; attaching means cooperating with said core to grip said plating point and make electric contact between said core and an unjacketed portion of said plating point; a removable dielectric shield bottom segment to seat upon and seal against the dielectric coating which covers said base and said rack, said bottom segment having a slot to make a snug sealing fit with the dielectric coating on the plating point; and a removable protective dielectric shield top segment surrounding the upper portion of the core, said top segment being constructed for attachment to the core and having a lower portion to make sealing engagement with bottom segment.

8 claims, 7 figures.

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The Effect of Impurities in Nickel Solutions

...and Methods of Purification

Bright nickel baths are usually much more sensitive to impurities than are matte nickel solutions, and certain contaminants are much more harmful than others. The effect of these contaminants and some methods of purification in current use are indicated below.

ARSENIC tends to lower the tensile strength of nickel deposits. It also causes dull, streaked, brittle deposits. The Liscomb method successfully removes arsenic.

CALCIUM sulphate in a nickel bath causes roughness, pitting and dullness. Filtration readily removes suspended crystals.

CHROMIUM contamination tends, generally, to reduce cathode efficiency and produce deposits in a marked degree of stress. The contaminant can be removed by the Liscomb method, by precipitation at a high pH, or by formation of insoluble lead chromate.

COPPER has the effect of producing dull, dark deposits in the low current density regions, and general fogging of the deposit in other regions. Most effective removal of traces is achieved by a low current density electrolysis at low pH, high temperature and high rate of agitation.

IRON as colloidal ferric hydroxide causes roughness. In a soluble form it codeposits with nickel. This impurity causes one form of pitting. Low current density electrolysis or high pH treatment removes iron.

LEAD causes dark, streaked deposits, and non-adhesion of nickel. Low current density electrolysis removes lead.

NITRATES in a nickel solution strongly depress current efficiency. High concentrations may stop deposition entirely. Electrolytic reduction at the cathode removes this impurity.

ORGANIC SUBSTANCES of many types, including grease, waxes, dust, etc., are detrimental. Their removal usually involves oxidation or carbon filtration, or both treatments.

SULPHUR, in the form of organic compounds, has a brightening effect in many types of nickel solutions. Nickel sulfide is harmful because it results in evolution of hydrogen sulfide and precipitation of sulfides. Although carbon treatment removes some organic compounds containing sulfur, and a high pH precipitates sulfides, there is no general method for removing traces of sulfur compounds.

ZINC in amounts of 0.007 oz/gal is a brightener in dull-nickel plating baths, but higher concentrations yield brittle deposits which may be dark or streaked. The Liscomb method can reduce zinc concentrations. However, low current density electrolysis is the most widely accepted process.

AES RESEARCH PROGRAM

The American Electroplaters' Society is conducting a comprehensive research program and has developed useful information on current plating problems. International Nickel, in addition to its other support of this program, feels that it will be a further service to make copies of these AES Research Reports available. For an authoritative 36-page bibliography and correlated abstract, we offer you a free copy of the AES Research Report, Serial No. 15, entitled "Effect of Impurities and Purification of Electroplating Solutions." Use the coupon, now.

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Please send me a copy of AES Research Report, Serial No. 15, entitled: "Effect of Impurities and Purification of Electroplating Solutions."

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THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N.Y.

Patent Abstracts

References cited: U. S. Patents 1,064,920; 1,521,592; 2,094,392; 2,097,321; 2,195,630; 2,439,190. Germany 353,147. France 542,766.

No. 2,599,178, June 3, 1952—Electrodeposition of Alloys of Molybdenum with Cobalt, Nickel and Iron—Matthew L. Holt and Henry J. Seim, assignors to Wisconsin Alumni Research Foundation.

The following baths are typical of those which can be used to give satisfactory molybdenum alloy deposits.

COBALT-MOLYBDENUM PLATING BATH

	grams
Cobalt sulfate heptahydrate	60
Citric acid	66
Sodium molybdate	4
Ammonium hydroxide sufficient to provide a *p*H of 4	
Water to give a total volume of 1 liter	
Temperature of 25° C	

NICKEL-MOLYBDENUM PLATING BATH

	grams
Nickel sulfate hexahydrate	60
Citric acid	66
Sodium molybdate	4
Ammonium hydroxide sufficient to provide the required *p*H (4 and 8)	
Water to give a total volume of 1 liter	
Temperature of 25° C	

IRON-MOLYBDENUM PLATING BATH

	grams
Ferrous sulfate heptahydrate	60
Citric acid	66
Sodium molybdate	4
Ammonium hydroxide sufficient to provide the required *p*H (6 and 7)	
Water to give a total volume of 1 liter	
Temperature of 25° C	

CLAIM 1. Method of electrodepositing an alloy of molybdenum and a metal of the class consisting of cobalt, nickel and iron which comprises: passing current between an anode and a cathode on which the alloy is to be deposited in an aqueous electrolyte consisting essentially of 60 grams per liter of a sulfate selected from the class consisting of cobalt, nickel and iron, citric acid in an amount in excess of the sulfate, 2 to 40 grams per liter of sodium molybdate, and sufficient ammonium hydroxide to provide a *p*H of from 4 to 8.

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A new plant soon will be under construction for manufacturing this widely used product and certain Lea products in heavy demand in the Midwestern industrial areas. Meanwhile, orders for GRIPMASTER can be placed at the address shown at the left.

General information can be obtained from the Lea Manager in the Detroit area whose name, address and phone number are also given.

Orders for Gripmaster should be sent to:
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P.O. Box 3943
Strathmore Station
Detroit 27, Michigan
Phone: Webster 3-5558

Please address requests for information and other correspondence to:
Dee J. Mosher
550 South Glenhurst
Birmingham, Michigan
Phone: Midwest 4-9051

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NOW, the new Probrite CR-723 White Alloy Process makes it possible for any shop to produce high quality decorative work on parts that can be color buffed. Control of the new process is simple. It requires only a single addition agent, 1 oz. to the gallon, which is lost only by dragout.

Probrite CR-723 is used directly over steel or copper and is then easily color buffed*. It costs less than the copper-chrome or copper-thin nickel-chrome being used today and the corrosion resistance is superior. After chrome plating, resistance in salt spray to white corrosion is over 40 hours, to red rust over 200 hours.

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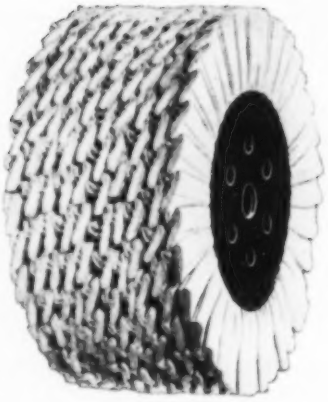

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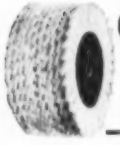

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Patent Abstracts

CLAIM 2. . . . wherein 1.5 mols of citric acid are used to one mol of a sulfate.

CLAIM 3. . . . wherein the cathode current density ranges from 1 to 22.2 amperes per square decimeter.

14 claims.

References cited: U. S. Patents 2,160,322; 2,428,404. Metal Industry November 22, 1946, pp. 434, 435, 436 (an article by L. E. Valler and M. L. Holt).

No. 2,600,171, June 10, 1952—Regeneration of Chromic Acid Baths Utilized in Electrodeposition of Chromium —G. Sagen, Copenhagen, Denmark.

CLAIM 3. Method of regenerating chromic acid solutions utilized in the electrodeposition of chromium comprising adding a neutralizing agent selected from the group consisting of alkaline earth carbonates and alkaline earth hydroxides to the solution in a quantity sufficient for precipitating the contents of trivalent chromium and iron from the solution, treating the precipitate thereby obtained with a solution of chlorinated lime to oxidize any trivalent chromium present to hexavalent chromium, separating the precipitate from the solution and treating the precipitate with concentrated sulfuric acid to form solid chromic acid anhydride and a solution of the impurities of the original bath, separating the chromic acid anhydride from the solution and adding the chromic acid anhydride to the original solution neutralized with the alkaline earth compounds

3 claims, 2 diagrammatic figures.

References cited: U. S. Patents 630,612; 1,851,603; 1,878,918; 1,926,758. Germany 608,806; 619,883. Schneidewind et al. Transactions Electrochemical Society, Vol. 53 (1928), pp. 499–507. Hoover et al. Industrial and Engineering Chemistry, Vol. 33 (1941), pp. 131–134.

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1— 2500 A. Chandev. 6/12 V.	1— 500 A. G. E. 28 V.
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1— 150 A. HVW 6 V.	1—1000 A. Chandev. 40 V.
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A.E.S News

Executive Board Offers Amendment to Constitution and By-Laws

The following amendment to the Constitution and By-Laws, providing for an increase of one dollar in minimum dues to be paid out for Research, is offered by Chicago Branch and approved by the Executive Board. It conforms to the recommendation of the Annual Meeting on June 19, 1952. A two-thirds vote is required for passage, and the vote must be taken within three months of this published notice. Delegates will be polled by mail and ballots returned under postmark not later than November 15, 1952 will be counted in the vote.

Moved: to amend two sections of the Constitution and three sections of the By-Laws of the Society, as follows, to increase minimum dues and Per Capita Tax for support of Research.

Constitution: Part I, Article V, Section 2: Annual Dues. At the end of the first sentence add the words "plus one dollar which shall be used to support research."

Constitution: Part I, Article V, Section 3: Per Capita Tax. Strike out "four dollars and seventy cents ($4.70)" and substitute "five dollars and seventy cents ($5.70)". At the end of the section add "and one dollar of which shall be paid into the Research Fund."

By-Laws: Part I, Article V, Section 3: Per Capita Tax. In the second line, strike out "$4.70" and substitute "five dollars and seventy cents ($5.70)". At the end of the first sentence, strike out "to defray the expenses of the Society."

By-Laws: Part II, Article V, Section 5: Treasurer. In the second paragraph, strike out "$4.70" and substitute "$5.70".

By-Laws: Part II, Article VIII, Section 1: Amount. Strike out "$8.00" and substitute "$9.00".

The above is approved for action by the Law Committee and by Chicago Branch, sponsor of the original motion.

LAW COMMITTEE:
Manson Glover
Chairman
August 7, 1952

Prize Money to Research Fund

Dr. W. A. Wesley, on behalf of himself, D. S. Carr and E. J. Roehl, authors of the paper, "Nickel Plating with Insoluble Anodes", and winners of the A. E. S. Silver Medal at the 1952 Convention, has contributed the cash award to the Research Fund.

Dr. Wesley wrote: ". . . This award will stimulate each of us in his technical research activities, but we are deeply aware of the need for more fundamental research in the field of electroplating if technical advances are to continue to be made. We, therefore, are impelled to donate the cash prize to the Research Fund of the Society . . ."

This action is appreciated by the Research Committee.

Headquarters Proceedings File

Although the Newark Public Library is only a few blocks from the present A. E. S. national office, it is desirable that a complete file of the *Proceedings* be preserved at Headquarters. Missing at present are 1945, 1944, 1939 (copy on loan from George Wagner), 1938, 1937, 1934 and all prior to 1928. Those who can spare back *Proceedings* to build up the Newark office library are requested to do so. It will be appreciated.

Sustaining Members

The following company has joined the ranks of sustaining members whose dues go to support of A. E. S. Research:

Siegel Robert Plating Company, St. Louis, Mo.

Grand Rapids Branch Paper Awards

The announcement in the April issue of PLATING of "Another First for the Grand Rapids Branch" was challenged by Hartford's Secretary prompted by Mr. Hogaboom. It should be noted that other Branches have set up awards for papers presented before their particular group, but that Grand Rapids in its action of last December has gone further than other Branches by setting up an additional award if the paper is published in PLATING.

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SAVINGS MOUNT when you install a Blakeslee Solvent Vapor Degreaser. Metal parts are rendered 100% oil-free and dry in a matter of seconds. You save on rejects in your finishing process—you save time—you save labor and you add LESS SOLVENT daily with a BLAKESLEE DEGREASER. "We sure have cut our degreasing costs since we installed that BLAKESLEE solvent vapor degreaser."
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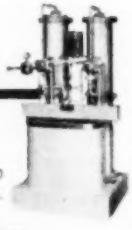

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Branch News

ALLENTOWN-READING

At the March 19th meeting, LIBRARIAN LEE WOTRING introduced three of the Branch members as speakers for the evening. In inaugurating the Better Acquainted Program, HOWARD SCHEARER, finishing supervisor of Keystone Lamp Manufacturing Corporation, gave the history of the plant which began operating in Slatington, Pa., in 1932, showed samples of the type of finishing done, and even demonstrated the assembling of a lamp; JOSEPH MCKEONE, as the assistant supervisor of the photo-engraving department of Paulsboro Manufacturing Company, told of the new Ballard process used to print wall and floor coverings and counter tops, passing around samples of the work; GEORGE NISSEN, project engineer for the 14-year-old Roller-Smith Corporation which manufactures "anything in the AC-DC line", spoke of his work on setting up a new plating room and on the analytical control of the plating solutions.

PEARL T. TREISBACH,
Secretary-Treasurer

GRAND RAPIDS BRANCH

The electroplaters' question, "What guides a guided missile", will be answered at the Grand Rapids Branch October meeting when MR. WM. F. ("Bill") CARR, engineer for Lear, Inc., Grand Rapids, addresses the Branch on the evening of Friday the 10th. His subject will be "Autopilots and Guided Missiles", and he will use his famous working model of a guided V-2 Rocket, the "Missile-toe", to demonstrate the theory of pre-determined target selection for guided missiles. "Bill" Carr's background is much too extensive to be given here—we could use this whole column—but take it from us, it's terrific.

This meeting will begin with another of those ever popular dinners served in a country atmosphere at Finger's Restaurant on U. S. 131, North of Grand Rapids. Every member should avail himself of

*"If I ever get the ??!x-??? who's guiding this one * . . ?"*

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Branch News

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CARL GREEN,
Publicity Chairman

JACKSON-LANSING BRANCH

Forty-eight members and guests attended the May 13th meeting at the Porter Hotel, Lansing, Mich.

After a little beverage foundation and a delicious meal the members were in a good mood to provide a lively discussion on White Brass Plating.

DR. R. B. SALTONSTALL, Technical Director of the Udylite Corporation, gave the members some very timely information on the profitable plating of White Brass and its indicated use as a substitute for our vanishing nickel plate.

LARRY HENDERSON provided a surprise movie entitled, "The Clean Look" from which we learned some of the secrets of feminine charm.

BILL MOGLE, our retiring President, thanked the officers and members for their able assistance and cooperation and also asked that every assistance possible should be given to our new President, RAY REDMOND.

J. H. HOEFER,
Publicity Chairman

MELBOURNE BRANCH

The 71st regular meeting of the Branch held on July 17, 1952 was attended by 35 members and visitors at the Melbourne Technical College.

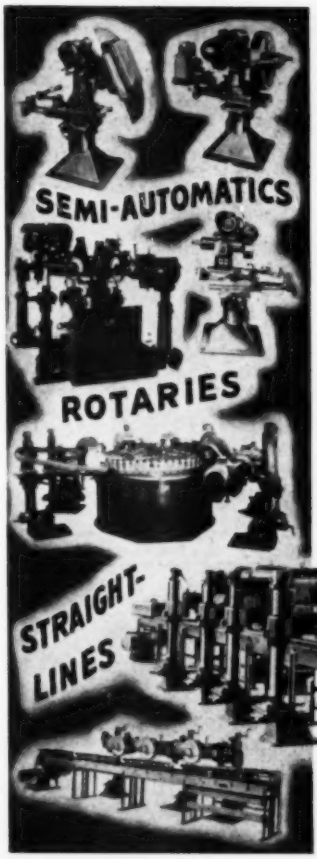
After the usual introduction by our regular half-hour of very popular and interesting films, which are made available and screened by GLEN WALKER, the speaker for the night, MR. BOB TAYLOR was introduced by MR. H. TEAGUE, our Librarian. Mr. Taylor's subject was "Plating Bath Control".

Regular control of plating bath conditions and solution compositions were discussed and methods within reach of the practical plater were detailed. Striking an informal note the speaker conducted the meeting in an open forum atmosphere, discussing with the members, control methods and equipment, solution sampling, and recording of bath histories, etc.

The meeting concluded at a late hour and all present agreed with CLIVE DALGLEISH who, when proposing a vote of thanks, stated he thought this meeting was one of the best ever, and the enjoyment of the members and visitors must surely be some reward for all the preparatory work done by MR. BOB TAYLOR.

S. B. PEARCE,
Honorary Secretary

ACME *Automatic Polishing and Buffing Machines*



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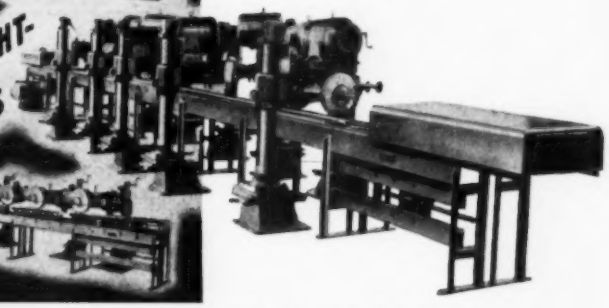

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KANSAS CITY: P. W. Keating, Frank J. Sweitz, Minor H. White
ROCKFORD: Robert E. Bohnsack, Eldon W. Dreier
TOLEDO: Frank M. Criscio, Joseph Rocco
MEMBER-AT-LARGE: Dr. T. Fujiwara, Japan; Herman Goldfarb, Port Jervis, N. Y.; Harvie J. Johnson, Chicago, Ill.; James R. McCaughna, North Hollywood, Cal.

Reinstatements

TOLEDO: William Russell

Transfers

Bernard A. Noel to Buffalo; Ray J. Dearth, William C. Pollard and King Ruhly from Chicago.

Resignations

CHICAGO: J. Barmore, A. Eder
CLEVELAND: Ernest S. Porter
DETROIT: J. Dean Clark, George R. Edgington, James J. Murtagh, Harry P. Osgood, Gordon O. Rice, Stanley P. Sax
GRAND RAPIDS: Robert H. Lillyblad

Suspensions

CHICAGO: J. Archer, Edward B. Anderson, C. Bank, Louis C. Brems, Charles L. Carll, Henry C. Cade, H. Burnson, H. L. Deyne, F. Dassinger, Lawrence M. Darrow, George C. Duncan, Louis Fontana, C. H. Hanley, Jr., Patrick T. Hall, L. G. Hakes, P. A. Jackson, Fred J. Hornby, George F. Kahle, F. J. Kolar, Jr., Joseph A. Kryszak, S. Lupescu, M. E. McKinney, J. V. Matthews, J. Manshard, Irvin E. Olson, Edward I. Peters, C. Prokuski, John Rowe, Howard L. Rasmussen, Eugene Schmidt, Frank K. Savage, Charles H. Sigl, D. F. Seymour, William Thomson, Richard D. Sullivan, Fred H. Stocke, Bernard E. Trainor, Arno L. Weller, G. Yochim
DETROIT: Severino Kennedy
WESTERN ONTARIO: Harvey J. Curry, Norman Matte, Wm. H. Stewart

Deaths

BRIDGEPORT: William Flaherty—Honorary Member
CHICAGO: R. V. Dawney, F. A. Witt
SYDNEY: W. W. Patterson

Membership Competition

BRANCH	Membership Apr. 1, 1952*	New Members	Net Change in Membership	Per Cent Net Change
First Group				
Toronto	132	7	+ 7	+ 5.3
New York	305	17	+16	+ 5.2
Melbourne†	168	8	+ 7	+ 4.8
Milwaukee	145	8	+ 6½	+ 4.5
Cleveland	212	10	+ 7½	+ 3.5
Philadelphia	203	4	+ 3	+ 1.5
Newark	240	3	+ 3½	+ 1.5
Grand Rapids	155	3	+ 2	+ 1.3
Bridgeport	154		+ ½	+ 0.3
Pittsburgh	132	5		
Boston	140			
Los Angeles	218	1	− 3	− 1.4
Detroit	500		− 8	− 1.6
Hartford	148	2	− 2½	− 1.7
Chicago	469	28	−19	− 4.1
Second Group				
New Haven	88	6	+ 7	+ 8.0
Cincinnati	80	4	+ 5	+ 6.3
Montreal	72	3	+ 3	+ 4.2
St. Joseph Valley	74	2	+ 2	+ 2.7
Baltimore-Washington	96	3	+ 2½	+ 2.6
Indianapolis	114	3	+ 2	+ 1.7
Buffalo‡	107	4	+ 1	+ 0.9
Dayton	81	3	+ ½	+ 0.6
Waterbury	115		+ ½	+ 0.4
St. Louis	102			
Saginaw Valley	71			
Providence-Attleboro	92	2	− 1	− 1.1
Syracuse	104	5	− 2	− 1.9
Rochester	88	4	− 2	− 2.3
Sydney	86	2	− 7	− 8.4
Rockford	79	3	−14½	−18.4
Third Group				
Louisville	24	9	+ 9	+37.1
Dallas-Fort Worth§	69	11	+11	+15.9
Toledo	39	4	+ 6	+15.4
Southeastern	47	6	+ 4½	+ 9.6
Kansas City		3 (34)	+ 3	+ 8.8
Springfield	55	3	+ 3	+ 5.5
Twin City	66	5	+ 3	+ 4.5
San Francisco	67	3	+ 3	+ 4.5
Lancaster	67	4	+ 2	+ 3.0
Jackson-Lansing	59	1	+ 1	+ 1.7
Adelaide	58			
Columbus	54			
Allentown-Reading	44			
Houston	40			
Hamilton	22			
Wichita		(19		
Western Ontario	19	2	− 1	− 5.3
Outside Competition				
At Large	125	5	+ 5	
In Transfer	23			
Total A. E. S.	5,748	249	+120	+ 2.1
Active Membership, June 30, 1952			5,868	

*Subject to correction. †, ‡, §Winners in first, second and third group, respectively, of 1951–1952 membership competition.

ECONOMICAL CONTROLS are conveniently located near where power is used, regulate d-c output of rectifiers by controlling a-c input.

STEADY PRODUCTION continued during the expansion. Engineer C. A. Lefever and worker H. A. Lease are examining screen as it leaves galvanizing process.

SPACE SAVING G-E plating rectifiers can be tiered. Since no special foundations are required, units are easily added as load grows.

New York Wire Cloth Co. spearheads 50% expansion with G-E plating rectifiers

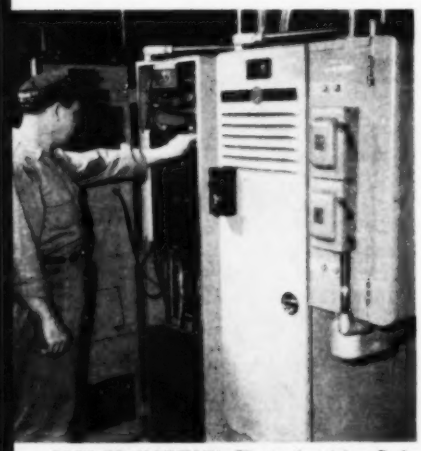
Skyrocketing demand for its Opal screening recently forced the New York Wire Cloth Company of York, Pennsylvania to expand its manufacturing facilities by 50%. G-E metallic plating rectifiers played an important part in this expansion.

The company's experience with G-E metallic rectifiers goes back to 1947 when five 2000-ampere units were installed to replace a power supply for galvanizing. These units proved so satisfactory that New York Wire Cloth standardized on them for future replacements and expansion.

Since that original installation, 24 additional 2000-ampere cubicles have been installed, providing power for electrolytic cleaning, plating and galvanizing. Mounted in tiers, in ventilated rooms removed from actual plating operations, they occupy little space, and require almost no maintenance.

Engineer C. A. Lefever says: "One of the finest features of these G-E metallic rectifiers is that once installed, they function perfectly without continual checks . . . I have been able to devote all my time to other expansion problems."

You, too, can profit from the easy maintenance, stable electrical characteristics, and extremely long life of G-E metallic plating rectifiers. For further information, contact your nearest authorized G-E plating agent, or write to Section 464-10, General Electric Company, Schenectady 5, New York.



EASY TO MAINTAIN. Plant electrician S. L. Ellsworth inspects and cleans G-E metallic plating rectifiers only once or twice each year.

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REMOVES RUST...
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Oakite Compound No. 33 is a great soak cleaner for steel, cast iron, aluminum sheet and castings. It removes oil, rust, heat scale, other oxides, carbon smut, soldering and welding residues, identification inks and other soils. *It frequently eliminates pickling operations on moderately rusty steel.*

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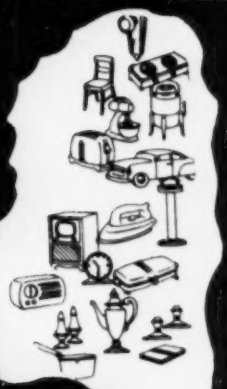

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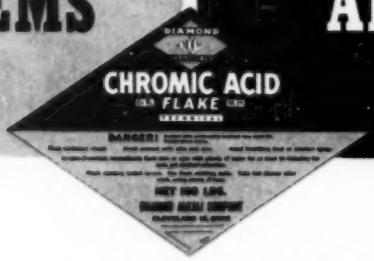

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AMERICAN CHEMICAL SOCIETY, 122nd National Meeting, Atlantic City, N. J., September 14–19.

MONTREAL BRANCH, A. E. S. Annual Banquet on October 2.

ANNUAL EXPOSITION OF THE SOCIETY OF INDUSTRIAL PACKAGING AND MATERIALS HANDLING ENGINEERS, Chicago, Ill., October 14–16.

34TH METAL CONGRESS AND EXPOSITION, sponsored by the American Society for Metals, Philadelphia, Pa., October 20–24.

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS' annual meeting, Cleveland, Ohio, December 7–10.

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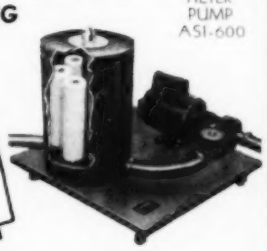

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Process for preparing aluminum for spot welding. This process gives low surface contact resistance readings uniformly all over the aluminum article processed. Aluminum can be stored after treatment and still maintain low resistance readings. Data Sheet #25.

Alum-i-niel No. 979

Special, two step organic phosphate acid type cleaner and deoxidizer for use prior to painting. Removes organic soils as well as metal oxides and at the same time provides a fine etch for excellent paint adhesion. Write for Data Sheets #18 and #24.

Alumetex Process

Improved process for electroplating directly on aluminum which assures excellent adhesion and lustre for any electrodeposit on all commercially used alloys of aluminum. Write for Data Sheet #13.

Metex Aluminum Cleaner No. 4

New, highly buffered dry alkaline wetting agent type powder for cleaning all types of aluminum without etching. Highly recommended for cleaning prior to anodizing, plating and other processes where no discoloration or etching can be tolerated.

Write for Data Sheet #24.

MacDermid Aluminum Bright Dip

Improved, MacDermid, Inc. acidic formula developed to produce a brilliant lustre to most types of non-silicon aluminum alloys. Write for Technical Data Sheet #21.

Metex F. S. Stripper

Improved material to be used with Nitric Acid solution — developed to speedily remove smut and oxides from aluminum at room temperature . . . needs only one minute immersion. Koroseal or stainless steel equipment recommended. Anodized coatings may be stripped with no attack or etching, in the same solution. Data Sheet #24.

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★ Write for "Index Listing" on all Data Sheets Available

...because we can prove *which* cleaner is right. That's the catch—and that's why H-VW-M cleaners do the best cleaning job. You see, with our complete facilities we'll prepare samples, apply compositions, buff, try various cleaners—even plate to compare final results. When we've finished ... duplicated every process and test that a manufacturer will use ... we *know* we've got the right cleaner.

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